AIR CONDITIONING HEATING AND VENTILATING

NOVEMBER, 1957—54th Year

One of Many Residences Served by Baseboard Heating
See page 81

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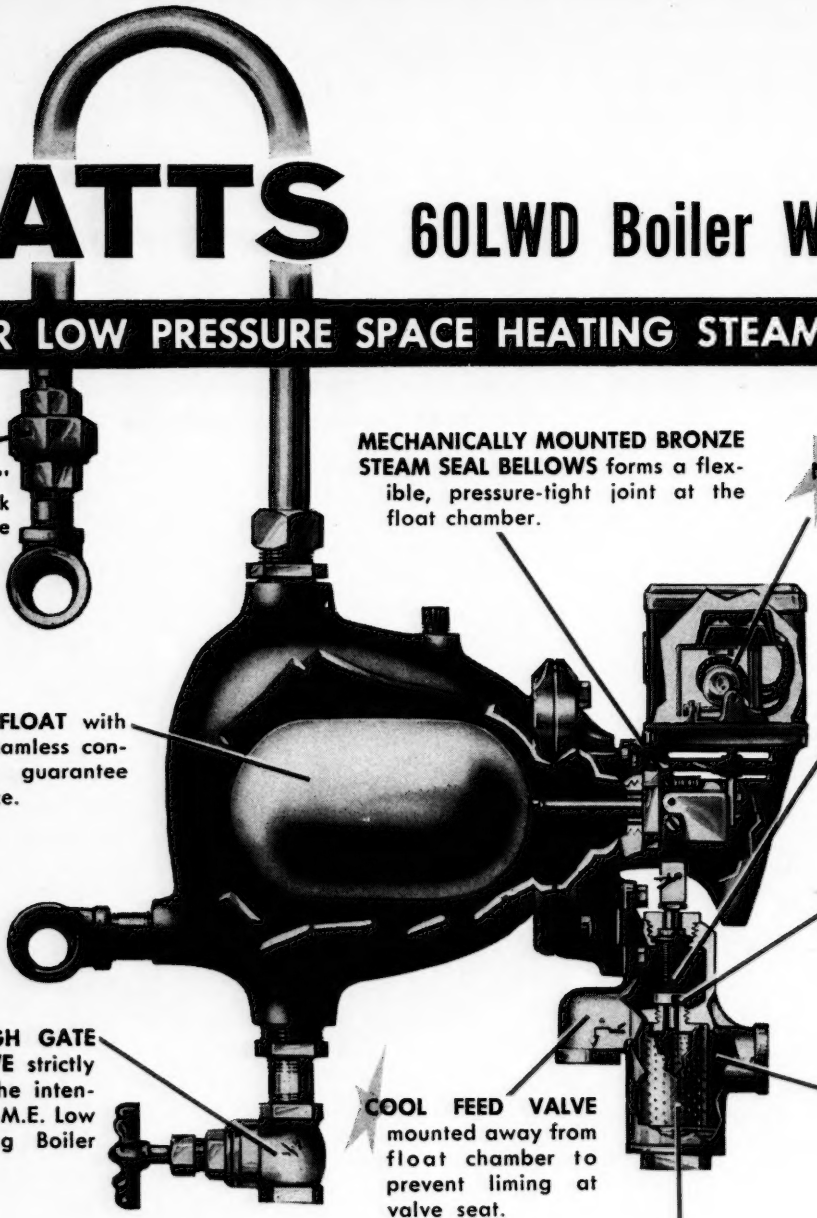
SINCE WATTS 1875

WATTS 60LWD Boiler Water Feeder

FOR LOW PRESSURE SPACE HEATING STEAM BOILERS



QUICK HOOK-UP ½" fittings for quick and easy gauge glass connection.

MECHANICALLY MOUNTED BRONZE STEAM SEAL BELLOWS forms a flexible, pressure-tight joint at the float chamber.

NEW MERCURY SWITCH DESIGN has no mechanical parts to stick or fuse.

PURE COPPER FLOAT with reinforced seamless construction to guarantee lifetime service.

FATIGUE-RESISTANT bronze water seal bellows provides a pressure-tight seal and keeps the valve stem guide dry so that it cannot corrode or stick.

WATTS FEED VALVES feature resilient, sticking-proof disc-to-metal seats that will not leak.

STRAIGHT-THROUGH GATE TYPE DRAIN VALVE strictly complies with the intentions of the A.S.M.E. Low Pressure Heating Boiler Code.

COOL FEED VALVE mounted away from float chamber to prevent liming at valve seat.

ENLARGED STRAINER area and sediment space provides an ample free-flow safety factor.

HEAVY GAUGE perforated copper strainer. Easily removed for cleaning.

WATTS 60 SERIES. Recently added refinements to the proven design of the Watts No. 60 establishes its unquestionable leadership in today's design of boiler water feeders. No better protection can be found.

No. 60 boiler water feeder only (without cut-off switch) for manually-fired steam boilers. An LWD mercury switch assembly may be added in the field at any time to make a combination boiler feeder and low water cut-off for automatic firing.

No. 60LWD. This feeder consolidates the No. 60 with a mercury switch assembly to provide a combination feeder and cut-off with alarm switch.

Series 60 capacity up to 5,000 sq. ft. of radiation. Maximum steam pressure 35 lbs. Maximum water pressure 150 lbs. Has ¼" tapping for pressure switch. Water valve connections ½" S.P.S. Gauge glass connections ½" S.P.S. Height (float chamber only) 8½". Width 5½". Length 12½". Weight 30 lbs.

NOTE: These starred features above make Watts feeders the most advanced boiler water feeders available on the market today.

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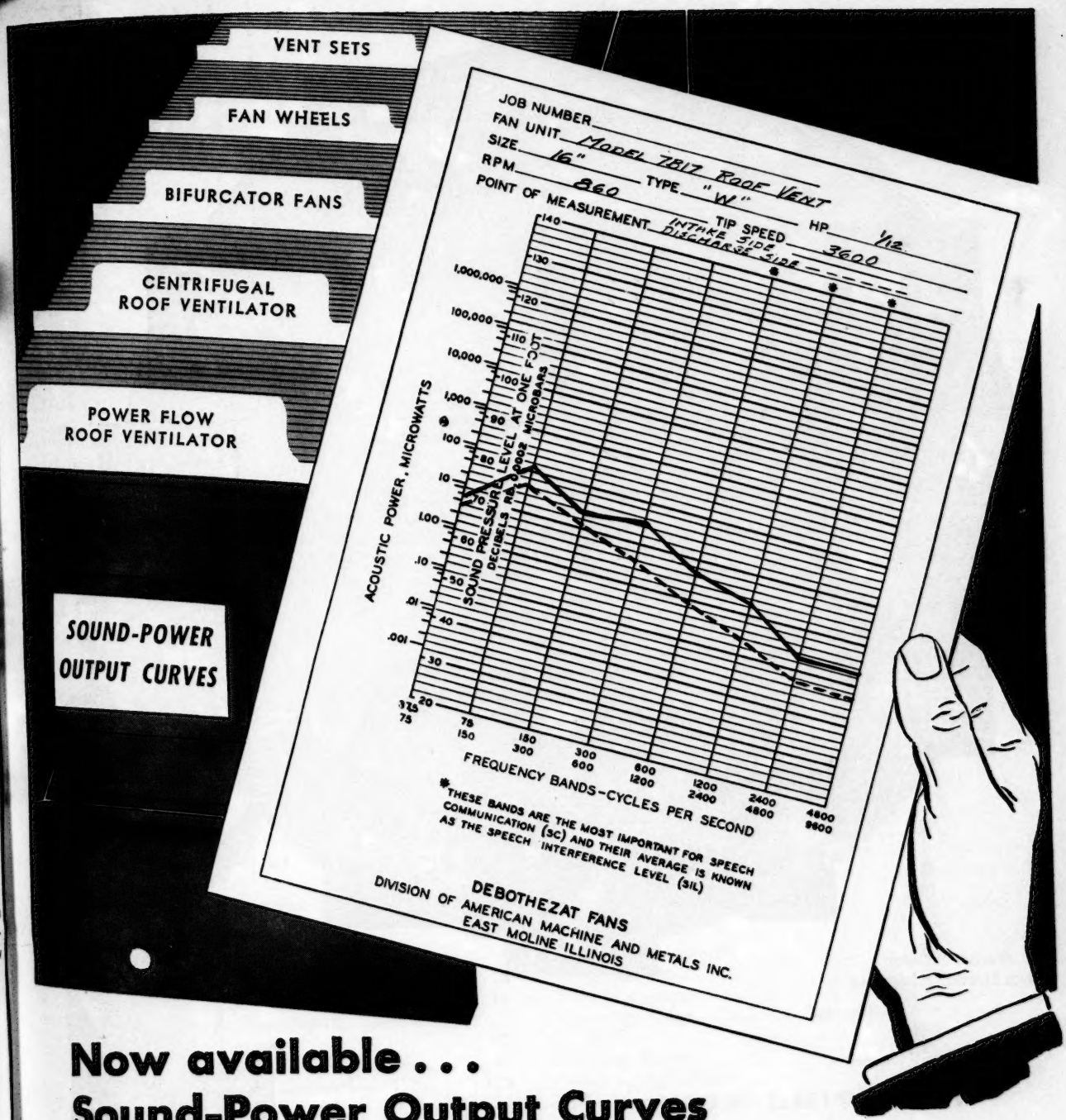
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AIR CONDITIONING HEATING AND VENTILATING

NOVEMBER, 1957

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The Cover: Baseboard heating has been installed in many residences to achieve winter comfort. Photograph, courtesy of Warren Webster & Co.

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HIGH SPOTS

• Some 200 architects and consulting engineers will attend the **All-Electric Heating and Air Conditioning Symposium** on November 21-22 at the Neil House in Columbus, Ohio, as guests of 6 Ohio electric utilities who are teaming with 10 equipment manufacturers to present material on up-to-date design and application practices of electric heating and air conditioning. Five major topics slated for the 2-day meeting include motor-driven summer air-conditioning equipment, heat pump, central plant equipment, packaged heat pumps, electric resistance space heating, and competitive equipment. The six utilities are Columbus and Southern Ohio Electric, Cincinnati Gas & Electric, Cleveland Electric Illuminating, Ohio Edison, Toledo Edison, and Ohio Power. Exhibits of electric heating and air-conditioning equipment will be on display. Manufacturers who will have officials on the program include Worthington, Trane, Frigidaire, York, Carrier, Westinghouse, General Electric, Wiegand, Electromode, and Wesix Electric Heater.

• In response to a local citizen who questioned the contribution of **air conditioning in the Justice Building in Little Rock, Ark.,** as compared to such requirements as water, sewers, lighting, heating, and telephones, the court decided: "Air conditioning is becoming standard equipment in homes, offices, and public buildings; it contributes to the comfort and efficiency of all those people who have occasion to utilize its benefits and is as necessary as telephones and heating in courthouses."

• A staff report on **residential baseboard radiation** based on a survey of leading manufacturers is presented in this month's Reference Section, starting page 81. Report will be followed with a summary of commercial and industrial systems. Hot water and steam ratings for residential baseboard radiation is presented in handy tabular form.

• The first day's session of a conference on **designing the indoor climate** concluded with a panel discussion on air conditioning. The panelists were the moderator, Mrs. Ramona Deitmeyer, Mrs. America of 1956, and 11 Los Angeles area newspaper women, home economics directors of their respective papers. **Among the points made by the ladies were:** Air conditioning reduces housekeeping chores by 50% . . . It makes possible more hot meals in summertime . . . It promotes sounder sleeping . . . It provides a welcome haven on a smoggy day . . . It filters out cooking odors . . . It makes for better indoor play conditions for children . . . It helps a career woman preserve her freshness and energy . . . **It keeps husbands home in the evening** . . . It prevents a lag in the conception of children in hot weather . . . It combats allergies, heart strain, and fatigue. The ladies challenged the engineers to provide more compact and lower priced air conditioning for the average residence. **For complete story** on the University of California in Los Angeles conference, see **News of the Month,** page 130.

• Cuban Gas Transmission Company has been organized to build a **gas pipe line** from the Campeche natural gas fields in Mexico, across the floor of the Gulf of Mexico, across 150 miles of Cuba to Havana, and undersea to Florida. The 650-mile project was conceived by Edwin Pauley, Los Angeles oil man.

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WASHINGTON OVERTONES

by LORING F. OVERMAN

● The persistent "beep-beep" of the Russian sputnik—soaring over Washington at all-too-regular intervals—was the solo overtone in the Nation's Capital for weeks after the successful launching.

Presidential press conferences discussed other topics, but questioners kept wondering about sputnik.

State Department reported on mid-East affairs; reporters wondered how much sputnik had to do with the crisis.

Pentagon announced a long series of armed services cutbacks, as required by Charles Wilson's swan-song order to save 10 percent. Members of Congress from areas affected by the cutbacks challenged such action in the face of "the new Soviet threat".

● Conceding only that sputnik represents a propaganda triumph, Washington was settling down by late October to a calm-as-possible appraisal of the situation, dictated by a determination not to be stampeded by demands for a "crash missile program" which might dissipate precious funds without accomplishing the desired result.

Nevertheless, the persistent beeping of sputnik was forcing many decisions not contemplated before telescopes and radios picked up the satellite.

● Certain to be high on the list is a review of defense policies. Armed forces spokesmen already question their ability to "live within the $38-billion budget" prescribed for fiscal 1958.

Senators Lyndon Johnson (D-Tex.) and Richard Russell (D-Ga.), Chairman of the Senate Armed Services Committee, were quick to recommend an investigation to determine why a U.S. satellite was not first to reach outer space.

Preliminary investigations by Senator Johnson's Preparedness Sub-committee were to determine whether there should be a full-scale hearing before the Armed Services group.

If preliminary hearings should indicate that lack of money is the culprit, there will be much testimony regarding how economy efforts sabotaged the satellite program.

Some suspect that inter-service rivalry was responsible, by dividing available funds and scientific knowledge among several projects. Others say this "competition" will result in "a better moon, a better intercontinental ballistic missile."

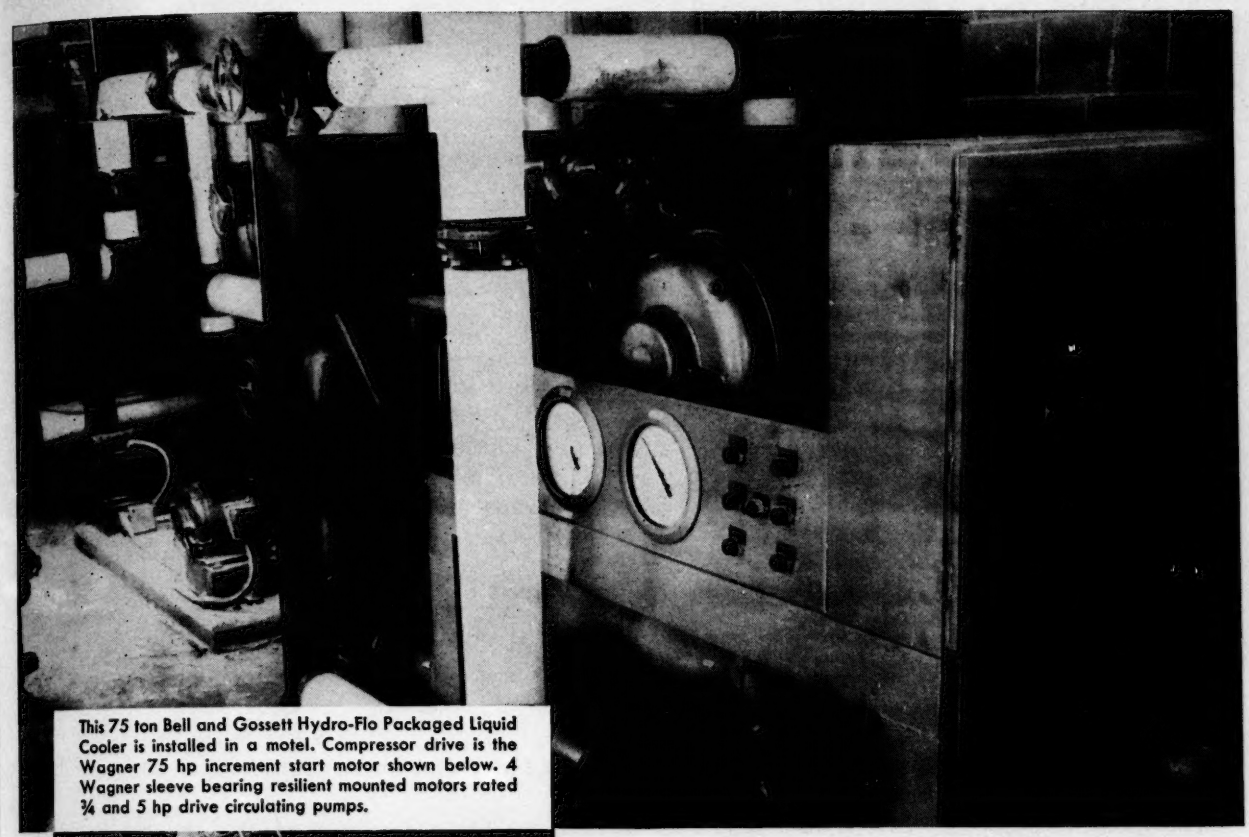
● Certain to affect heating and ventilating people, among others, is the probable impact of Operation Catch-Up upon hoped-for tax reductions.

Prior to sputnik, it had seemed virtually certain that politics alone would dictate a tax cut during the coming election year. Currently, even the taxpayer appears more interested in again being top-dog in the defense field, than in saving a few dollars.

● National Association of Manufacturers and other tax-conscious groups argue against the "expenses-be-damned" school of thought. They urge a program to curtail unnecessary spending; to encourage judicious defense spending; and to end income taxes at rates they consider stifling to initiative and to investment capital.

The important subject of tax studies will "blast off" on January 7, 1958. On

(Continued on page 8)



This 75 ton Bell and Gossett Hydro-Flo Packaged Liquid Cooler is installed in a motel. Compressor drive is the Wagner 75 hp increment start motor shown below. 4 Wagner sleeve bearing resilient mounted motors rated ¾ and 5 hp drive circulating pumps.

Wagner two-step combinations suit most applications. For installations where unusually low inrush of starting current is required, Wagner can furnish 3, 4, 5, or 6 step increment motor-starter combinations.

WAGNER

Increment Motor-Starter Combinations limit inrush of current when starting big motors

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Why don't you investigate Wagner Increment Motor operation? Ask your nearby Wagner engineer to take you to an installation in your area. See how it works—judge for yourself, and then let him help you select the combination that meets your requirements. Call the nearest of our 32 branch offices, or write for Bulletins MU-128 and MU-195.

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WASHINGTON OVERTONES *(Continued from page 6)*

that date the House Ways and Means Committee will open a 30-day hearing to listen to suggested tax revision proposals.

Other important tax policy matters are to be discussed November 18-27 in a series of panel discussions before the Fiscal Policy Subcommittee of the Senate and House. The discussions will consider federal expenditure policy.

● After mentally consigning sputnik to outer space, Washington came up with several news bits encouraging to the construction industry and its satellites—including members of the heating, ventilating and air-conditioning industries.

Home-building in 1958 is expected to reach 1,100,000 units—possibly 1,150,000—according to preliminary estimates. Forecast is based on a vacancy rate of 2.8%—down from last year's 3%. Also considered is an estimated 700,000 to 800,000 new households needing more adequate housing next year.

Increased availability of mortgage money will assist, although interest rates will be high. This disadvantage will be somewhat offset by FHA's acceptance of low down payment deals.

● Total construction during September set a new all-time record at $4,618 million. The total was 4% over September of last year, largely due to expenditures for public utilities construction.

Annual rate for housing during September rose to $12.7 billion from $12.4 billion—best gain in the annual rate for home building since downgrading started in 1956.

Annual rate of construction for the first nine months of 1957 totaled $35.1 billion—a 2% gain over the same period last year.

● Descriptions of 1,373 uncompleted water and sewerage projects estimated to cost $880 million under three postwar planning programs are available in bulletin form to interested industry people. Copies of the bulletin, entitled "Water and Sewerage Projects in the Advance Planning of Non-Federal Public Works Programs", may be purchased at 25 cents from the Sales and Distribution Branch, Office of Administrative Operations, Commerce Department, Washington 25, D.C., and from the department's field offices.

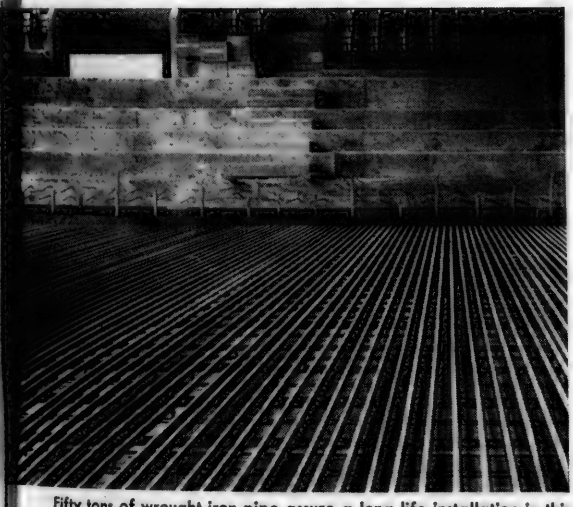
In two of the programs there are 247 water construction projects to cost $79 million, and 1,039 sewerage projects estimated to cost $696 million. The third program includes 26 water projects and 61 sewerage projects, to cost $16 million and $89 million, respectively.

● A report on the properties of 440 samples of burner fuel oils has been published by the Bureau of Mines. The samples were manufactured by 44 large and small petroleum refining companies in 129 refineries in this country and Canada. Typical samples were analyzed by the companies in accordance with Bureau instructions. The Bureau of Mines then compiled data and issued the report, entitled Burner Fuel Oils, 1957. Report is the third of the kind issued by the Bureau with the cooperation of the American Petroleum Institute and the Oil-Heat Institute of America.

● Sputnik's disturbing overtone refuses, however, to be silenced. Latest addition to Washington thinking is the estimate that missile production will cost $4 billion annually by 1961. Forecaster is Brigadier General Beverly H. Warren, Deputy Director of Production at the Air Materiel Command. This year's missile bill will be $2 billion, he estimates.

This corrosion resistant 1-inch wrought iron pipe was cold bent to 4½-inch centers.

Wrought Iron assures piping permanence at Long Island Sports Arena



Fifty tons of wrought iron pipe assure a long life installation in this indoor rink. Usable floor area totals 17,000 sq. ft.

The ice rink at Long Island Sports Arena in Commack, New York, has a built-in defense against corrosion—60,000 feet of wrought iron pipe. Extra-heavy black wrought iron pipe was used for all bends in coil installation. For straight runs, one-inch standard weight black wrought iron pipe was used.

Major rinks throughout the country rely on wrought iron's unique defense against corrosive attack. Thousands of glasslike iron silicate fibers per cross sectional square inch account for the material's exceptional corrosion resistance and assure low cost per-year-of-service.

A special report prepared by our Engineering Service Department, *Ice Skating Rinks—Their Construction and Maintenance*, tells how to maintain effective corrosion control in this field. Write for your copy. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

Long Island Arena, Thomas Lockhart, Manager
Architect: J. H. Van Alst, Centerport, L.I., New York
Contractor: Frick Company, Waynesboro, Pennsylvania

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BRIEFLY STATED

New address of ENGINEERING DEPARTMENT, THE ANACONDA COMPANY, is Room 1000, 26 Broadway, New York 4, N. Y. . . . THE BABCOCK & WILCOX COMPANY'S REFRACTORIES DIVISION announces that its Augusta, Ga., office is now in Room 408, News Building, 725-31 Broad Street, Augusta. Its New York district sales office also moved, to 135 Cedar St., New York 6 . . . Fielden Instrument Div., ROBERTSHAW-FULTON CONTROLS COMPANY, is renamed INSTRUMENT DIVISION, It is located in Philadelphia.

WITH THE INSTITUTES AND ASSOCIATIONS—Marshall F. Allen, former manager of Magnesia Insulation Manufacturers Assn., is appointed executive vice-president of AIR MOVING AND CONDITIONING ASSOCIATION (AMCA). He succeeds L. O. Monroe, former administrative head of the 58 member company trade group. Nine new directors, unanimously elected at the Association's third annual meeting are: L. Macrow, manager of Systems & Equipment Dept., Carrier Corporation, representing AMCA's Central Station Air Conditioning Division; R. A. Wasson, vice-president and general manager, Clarage Fan Company, representing the Centrifugal Fan Division; E. J. Stone, sales manager, Propellair Div., Robbins & Meyers, Inc., representing the Industrial Axial & Propeller Fan Division; W. A. Curtis, manager, Blower Div., Peerless Electric Company, representing the Power Roof Ventilator Division; Wallace Allen, Jr., secretary, American Coolair Corporation, representing the Residential Fan Division; J. J. Merrick, division sales manager, John J. Nesbitt, Inc., representing the Unit Heater Division; and W. H. Rietz, president, Ilg Electric Ventilating Company, J. W. Wilcock, sales manager, Sturtevant Div., Westinghouse Electric Corporation, and C. W. Lockhart, sales manager, Blower and Air Div., Buffalo Forge Co., directors-at-large for one-year terms . . .

Peter B. Gordon, vice-president of Wolf & Munier, New York City, and president, American Society of Heating and Air-Conditioning Engineers; and Arthur N. BecVar, manager of industrial design, General Electric Company; have been appointed to the Board of Governors of BUILDING RESEARCH INSTITUTE. They will serve three-year terms ending June 30, 1960 . . . NATIONAL CLAY PIPE MANUFACTURERS ASSOCIATION expects completion this fall of its new research facilities at Crystal Lake, Ill. . . . William P. Tennity, Los Angeles, was elected president of WESTERN AIR CONDITIONING INDUSTRIES ASSOCIATION. Arthur Hess was named vice-president, and Fred J. Tabery re-elected secretary-treasurer. One of the organization's major programs has been the Western Air Conditioning, Heating, Ventilating and Refrigeration Conference & Exhibit, scheduled for May 7-11, 1958, at Shrine Exposition Hall in Los Angeles . . .

Manufacturers of almost all of the room air conditioners made in the U.S. will again publish capacity ratings of their products in terms of Btu per hr in 1958, AIR CONDITIONING AND REFRIGERATING INSTITUTE has been assured . . . Clifford V. Coons, executive vice-president of Rheem Manufacturing Company, is the new president of GAS APPLIANCE MANUFACTURERS ASSOCIATION, succeeding Julius Klein, president, Caloric Appliance Corp., Philadelphia. Edward A. Norman Jr., president, Norman Products Co., Columbus, Ohio, is first vice-president. Second vice-president is Wendell Davis, president, Cribben & Sexton Co., Chicago. Treasurer for a second time is Stanley H. Hobson, president, Geo. D. Roper Corp., Rockford, Ill. New division chairmen are: Automatic Controls Div.—S. L. Kile of Basso, Inc., Milwaukee; Direct Heating Equipment Div.—E. M. Douthat Jr., Locke Stove Co., Kansas City, Mo.; Domestic Gas Range Div.—J. P. Wright, Florence Stove Co., Chicago; Appliance Regulator Div.—Wayne H. Schutmaat, Penn Controls, Inc., Goshen, Ind.; Boiler Div.—E. T. Selig, Burnham Corp., Boiler Div., Irvington, N. Y.; Clothes Dryer Div.—John W. Benson, Whirlpool Corp., St. Joseph, Mich.; Gas Conversion Burner Div.—H. P. Mueller Jr., Mueller Climatrol Div., Worthington Corp., Milwaukee, Wis.; Engine Compressor Div.—Austin C. Ross, Worthington Corp., Buffalo, N. Y.; Furnace Div.—Edward P. Hayes, The C. A. Olsen Mfg. Co., Elyria, Ohio; Incinerator Div.—William R. Hebert, Calcinator Corp., Bay City, Mich.; Meter and Regulator Div.—Thomas J. Watt, The Sprague Meter Co., Bridgeport, Conn.; Refrigerator Div.—Louis Ruthenburg, Servel, Inc., Evansville, Ind.; Unit Heater and Duct Furnace Div.—Robin A. Bell, Surface Combustion Corp., Toledo, Ohio; Valve Div.—Norman J. Reiff, The W. J. Schoenberger Co., Cleveland, Ohio; Vent & Chimney Div.—B. A. Johnson, Condensation Engineering Corp., Chicago, Ill.; Wall & Floor Furnace Div.—A. J. Horn, Day & Night Mfg. Co., Monrovia, Calif.; Water Heater Div.—David C. Cannon, Lawson Mfg. Co., New Kensington, Pa.; Hotel, Restaurant & Commercial Gas Equipment Div.—T. B. Madole, Malleable Steel Range Mfg. Corp., South Bend, Ind.; Industrial Gas Equipment Div.—E. J. Funk Jr., C. M. Kemp Mfg. Co., Baltimore, Md.; and Relief Valve Div.—A. F. Craver, Patrol Valve Co., Cleveland, Ohio . . .

Leslie B. Worthington, president, Columbia-Geneva Steel Div., United States Steel Corporation, has been named to the board of directors of STANFORD RESEARCH INSTITUTE . . . J. J. Drapeau, mechanical engineer, has joined the Air Conditioning, Heating, and Refrigeration Section, Building Technology Div., NATIONAL BUREAU OF STANDARDS. He will study heat and moisture transfer in refrigerated structures and participate in development of a standard rating method for such structures . . .

The following were elected members of the board of directors, OIL-HEAT INSTITUTE OF AMERICA, INC.: Manufacturer Div.—Robert Andler, president, Electrol Burner Mfg. Co., Rutherford, N. J.; D. A. Campbell, vice-president, Eclipse Fuel Engineering Co., Rockford, Ill.; J. Eubanks, general manager, V&E Products, Inc., Schuylkill Haven, Pa.; John Hancock, president, Manville Boiler Co., New York City; H.

(Concluded on page 12)

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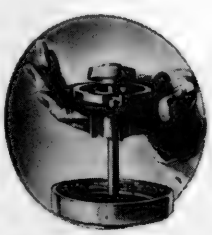
DELANY diaphragm type FLUSH VALVES were specified to provide the rugged performance and graceful appearance to meet tomorrow's tailored building designs. These DELANY FLUSH VALVES will be performing perfectly . . . will look as new as today . . . when this years-ahead building becomes contemporary in the future. DELANY VALVES will enhance this future with a record of faultless service.



One of the major reasons behind the longer-lasting performance of DELANY diaphragm type FLUSH VALVES is the simplicity of design of the interior working assembly. Only six working parts, including a highly durable chromed leather diaphragm, provides positive performance and ease of maintenance found in no other valve today.

DELANY *Flush* VALVES

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BRIEFLY STATED

(Concluded from page 10)

McClure, manager of sales, Kewanee Boiler Div., American-Standard, Kewanee, Ill.; H. B. Rohrer, Herco Oil Burner Corp., Lancaster, Pa.; G. A. Taylor, vice-president, Bethlehem Foundry & Machine Co., Bethlehem, Pa.; W. D. Wood, sales manager, Timken Silent Automatic Div., Scaife Co., Oakmont, Pa. Accessory Div.—E. B. Frame, chief engineer, Monarch Mfg. Works, Philadelphia; R. W. Hundley, general sales manager, Wm. Steinen Mfg. Co., Newark, N. J.; F. Weldon, sales manager, Perfex Div., General Controls Co., Skokie, Ill.; and K. L. Wilson, vice-president, Minneapolis-Honeywell Regulator Co., Minneapolis.

NEW REPRESENTATIVES—Hill Electric Air Conditioning, Inc., Wichita, Kan., for ALLIS-CHALMERS MFG. COMPANY pumps, will represent the line in 10 central and southeastern Kansas counties . . . C. W. Dean and Associates, Memphis, manufacturers representatives, have added AMERICAN AIR FILTER COMPANY air filter, engine, and compressor products, in addition to dust control, unit ventilator, and heating and ventilator products as formerly . . . For HARCRAFT BRASS, Torrance, Calif., C. Victor Hanson Co., Minneapolis, Minn., their line of brass and flexible supplies . . .

Barnhart-Dwyer Co., Albuquerque, N. M., will represent BUENSOD-STACEY lines, as will Pedley Equipment Co., Charlestown, W. Va. . . . Appointment of W. H. Kiefaber Co., Dayton, Ohio, as COPELAND REFRIGERATION CORPORATION wholesaler is announced . . . Representing PENNSALT CHEMICAL CORPORATION's Isotron refrigerants is Pacific Scientific Co., Los Angeles, San Francisco, Portland, and Seattle, while American Potash & Chemical Corporation will distribute the refrigerant nationally . . . TRION, INC., announced appointment of these additional representatives for its commercial and industrial units: Air Filter Sales and Service Co., Inc., Jackson, Miss., and Devlin Brothers, New Orleans, La.

AMONG THE MANUFACTURERS' PERSONNEL—John J. McDermott, formerly assistant, is now production manager at THE BABCOCK & WILCOX COMPANY's Barberton, Ohio, Works, replacing H. G. Lane who is now with the plant's Engineering Department . . . Fritz C. Hyde Jr. is new manager of New York district sales for REVERE COPPER & BRASS, INC. Daniel H. Sangster succeeds him as sales manager of the Foil Division . . . Gene H. Binning is promoted to branch office manager of THE TRANE COMPANY's Oklahoma City territory . . . Three executives of YUBA INDUSTRIES' newly acquired Heat Transfer Division have been appointed vice-presidents: W. E. Brockel, chief engineer of the division, is designated vice-president, engineering; R. A. Beck is vice-president, sales; and N. S. Livingston, general manager of the division, is also a vice-president . . . CHASE BRASS & COPPER COMPANY announces three key promotions: Charles L. Denehy is production control manager at the company's Cleveland Mill. Thomas M. Rianhard takes his place as production control manager for the Metal Works, and Kenneth J. McNeill succeeds Mr. Rianhard as superintendent of the Sheet Mill at Waterville . . .

Ralph W. Moore, active in the heating and refrigeration industry for over ten years, has become associated with the Sales Department of DETROIT CONTROLS DIV., AMERICAN-STANDARD, and will be headquartered in Charlotte, N. C. . . . Frank V. McCarthy is appointed regional manager of ELJER DIV., THE MURRAY CORPORATION OF AMERICA. He succeeds W. E. Luley, retired, and will supervise the Western Pennsylvania, Ohio, and West Virginia areas, operating from Eljer's Cleveland office . . . New director of public relations of RHEEM MFG. COMPANY is Earl Kirmser . . . New San Francisco district manager for KEASBEY & MATTISON is James R. Reichel . . .

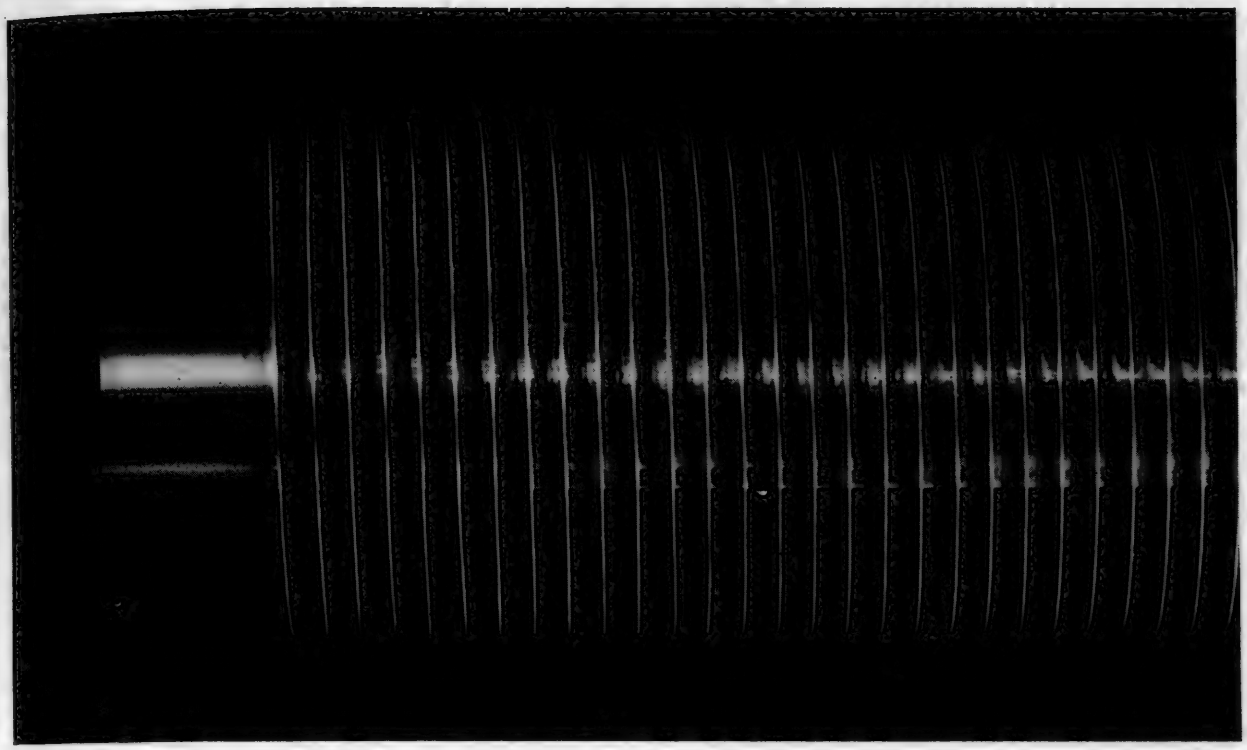
Promotion of Joseph W. Rath to superintendent, and T. A. Thompson to assistant superintendent in the Open Hearth Department of WEIRTON STEEL COMPANY DIVISION OF NATIONAL STEEL CORPORATION was announced . . .

The appointment of William A. Bours, III, as director of sales of DU PONT'S FREON PRODUCTS DIVISION, succeeding Robert J. Thompson, who retires at the end of the year, was announced . . . Six new zones are established to handle sales and engineering for AIRTEMP CONSTRUCTION DIVISION, CHRYSLER CORPORATION: Northeast—F. D. Halama, headquartered in New York City; Southeast—F. G. Kilburn, headquartered in Atlanta; Mid-Central—R. M. Hagan, Chicago; Southwest—W. F. Jeffers, Dallas; West Coast—manager to be named for headquarters in Los Angeles; North-Central—J. V. Weigle, Dayton . . . New credit manager for A. M. BYERS COMPANY is Robert J. Herpel, with the company since 1927 . . .

Ralph J. Tarasco will assist C. L. Babin, manager for EXPORT DEPARTMENT, DUNHAM-BUSH . . . John Young is appointed district sales representative of COPELAND REFRIGERATION CORPORATION for the area of Kansas, Missouri, and Southern Illinois, while Donald R. Macklem covers Nebraska, Iowa, Northern Illinois, and Southern Wisconsin in the same capacity. Field representative for Texas and Oklahoma is Louis A Wallace . . . Ed O. Reese, general superintendent of flat rolled and tubular products, is promoted to manager, Youngstown District, YOUNGSTOWN SHEET & TUBE COMPANY. He is succeeded by John H. Stone.

• Retirement of Charles H. Grissom, Jr., and appointment of Miss Mary Ivins to replace him as credit manager of WARREN WEBSTER & COMPANY was announced. Starting in 1900, Mr. Grissom had been credit manager for 50 years, from 1941 assistant secretary of the company, and from 1941 to 1954 he served on the board of directors.

• Theodore E. Mueller, former chairman of the board of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION, was 72 when he passed away in Louisville, Ky. He had risen from apprentice pattern maker earning 50 cents a day, while attending Carnegie Institute of Technology at night. When he was transferred to Standard Sanitary's Louisville plant to become its first plant engineer, he continued his education by enrolling in the International Correspondence School.



AEROFIN
Smooth-Fin Coils offer you

Greater Heat Transfer
per sq. ft. of face area

Lower Airway Resistance
—less power per c.f.m.

Aerofin smooth fins can be spaced as closely as 14 per inch with low air friction. Consequently, the heat-exchange capacity per square foot of face area is extremely high, and the use of high air velocities entirely practical. Tapered fin construction provides ample tube-contact surface so that the entire fin becomes effective transfer surface. Standardized encased units arranged for simple, quick, economical installation.

Write for Bulletin S-55

AEROFIN CORPORATION

101 Greenway Ave., Syracuse 3, N. Y.

Aerofin is sold only by manufacturers of fan system apparatus. List on request.

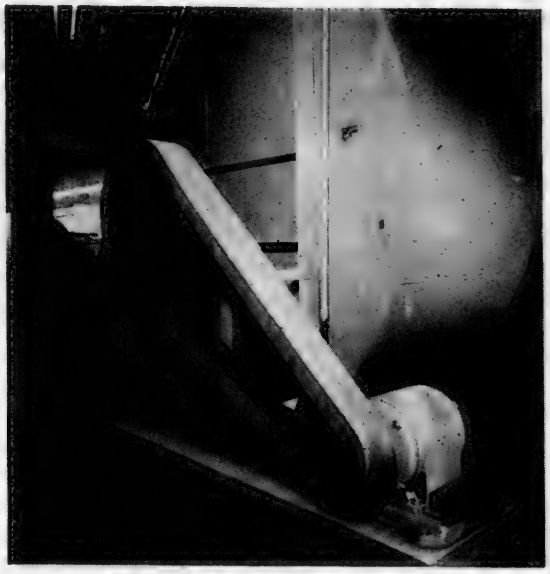
It's cool comfort at this textile

GUILFORD TEXTILE MILLS, GREENSBORO,

Modern Textile Mills, such as shown above, require accurate control of air temperature, humidity, cleanliness and distribution. Air Conditioning Corporation and The Massachusetts Blower Division of The Bishop & Babcock Mfg. Co. have combined to meet these requirements.

MASSACHUSETTS BLOWER DIVISION
The BISHOP & BABCOCK Mfg. Co.
4901 HAMILTON AVENUE · CLEVELAND 14, OHIO

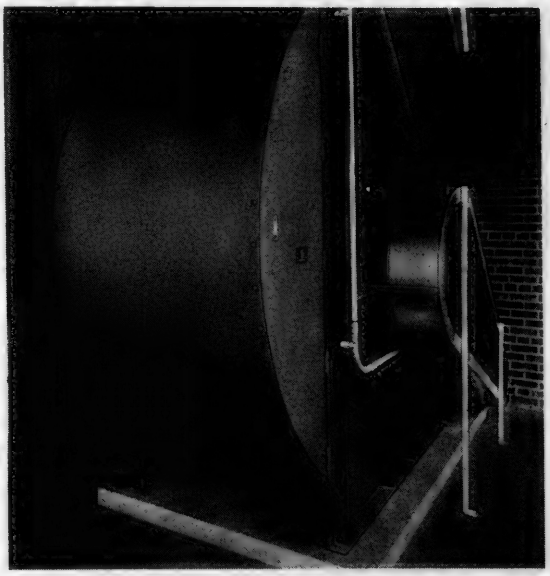
The MASSACHUSETTS Line



Conventional air moving equipment (Massachusetts) operated 24 hours daily, six days per week, since 1948.

mill with MASSACHUSETTS!

NORTH CAROLINA

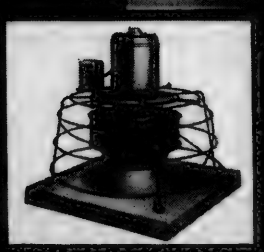


Recently installed Massachusetts Fan distributing conditioned air. Contractor: Air Conditioning Corporation, Greensboro, North Carolina.

The distribution of conditioned air by Massachusetts Fan, plays an important part in the processing of fabrics in this weaving department.

Announcing a ne

Trane Roof
that cuts



Sizes of 7, 9, 10, 12 and 13-inch wheel diameter feature direct drive, low silhouette spun aluminum housing.

Contoured inlet cone, shown at left, is featured on all sizes, increases fan efficiency, reduces noise, cuts power costs.

a new centrifugal f Ventilator s power costs!

Now, 16 sizes, all with certified ratings; smooth, quiet operation, less power consumption!

Now TRANE brings you a completely new line of *centrifugal* Roof Ventilators—designed for top efficiency and economical operation, with a minimum of noise and vibration.

In 16 fan sizes from 7″ to 40″ wheel, they're streamlined, lightweight, compact, easy to install—shipped as one unit, fully assembled.

All-new design, with TRANE-made fans and scientifically contoured inlet cones give greater efficiency, more cfm with less power. Air is guided into the fan blades smoothly, efficiently, to reduce noise and eliminate power-wasting eddies.

Units feature spun aluminum housings in sizes through 22″ . . . contoured steel housings in larger sizes. In all, they offer lower silhouette, weatherproof design, laboratory-proved performance with *certified ratings*. Completely serviceable from the roof, they're easy to install because they're shipped as one unit, completely assembled.

Next time you need a roof ventilator that operates with quiet efficiency against resistance, make it TRANE! TRANE Roof Ventilators cost no more than many units without these quality features. Call your nearby TRANE Sales Office for complete facts on TRANE Roof Ventilators . . . Unit Heaters . . . Self-Contained Air Conditioners . . . Fans, Coils and Steam Specialties. Or write TRANE, La Crosse, Wis.

For any air condition, turn to

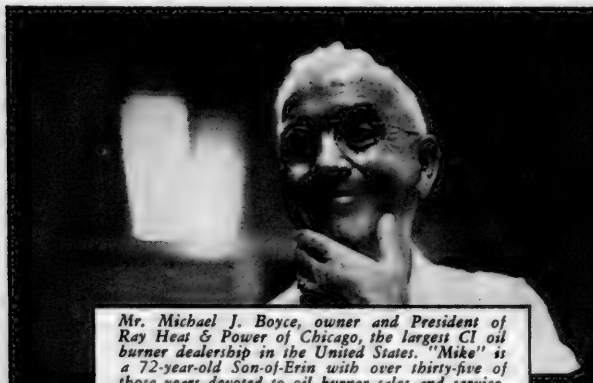
TRANE

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

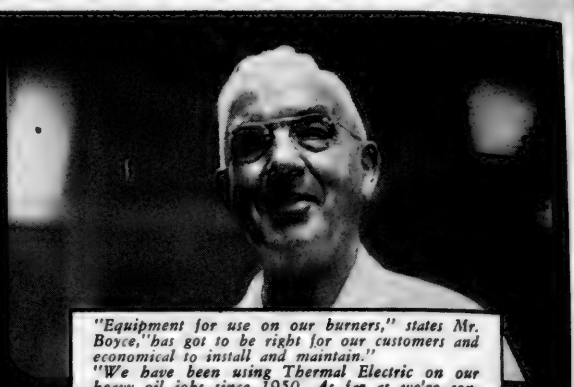
THE TRANE COMPANY, LA CROSSE, WIS. • SCRANTON MFG. DIV., SCRANTON, PA.
TRANE COMPANY OF CANADA, LTD., TORONTO • 96 U.S. AND 19 CANADIAN OFFICES

Sizes of 15, 16, 18, 20 and 22-inch wheel diameter are either direct or belt-driven; feature low silhouette spun aluminum housing.

Sizes of 24, 27, 30, 33, 36 and 40-inch wheel diameter are belt-driven models. Steel housing is arched for low silhouette.

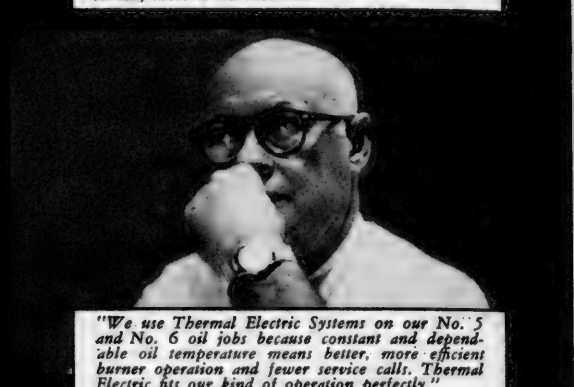


Mr. Michael J. Boyce, owner and President of Ray Heat & Power of Chicago, the largest CI oil burner dealership in the United States. "Mike" is a 72-year-old Son-of-Erin with over thirty-five of those years devoted to oil burner sales and service.

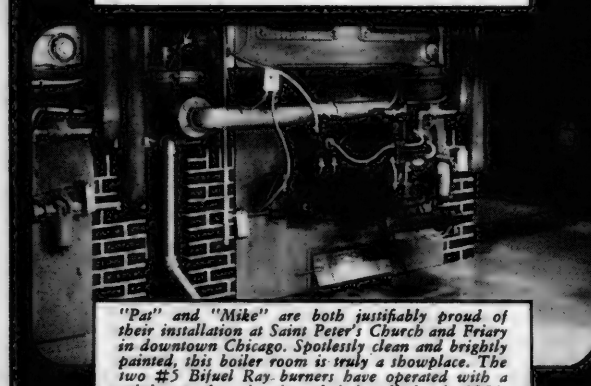


"Equipment for use on our burners," states Mr. Boyce, "has got to be right for our customers and economical to install and maintain." "We have been using Thermal Electric on our heavy oil jobs since 1950. As far as we're concerned, there is no substitute."

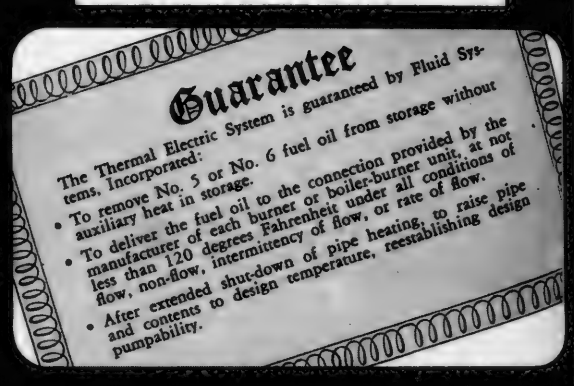
F. J. "Pat" Moran, Sales Manager of Ray Heat & Power of Chicago. "Our number one position is no accident. It's a result of quality product, quality installation, and quality service."



"We use Thermal Electric Systems on our No. 5 and No. 6 oil jobs because constant and dependable oil temperature means better, more efficient burner operation and fewer service calls. Thermal Electric fits our kind of operation perfectly."



"Pat" and "Mike" are both justifiably proud of their installation at Saint Peter's Church and Friary in downtown Chicago. Spotlessly clean and brightly painted, this boiler room is truly a showplace. The two #5 Bifuel Ray burners have operated with a minimum of service since their installation in 1951.


Guarantee
The Thermal Electric System is guaranteed by Fluid Systems, Incorporated:
• To remove No. 5 or No. 6 fuel oil from storage without auxiliary heat in storage.
• To deliver the fuel oil to the connection provided by the manufacturer of each burner or boiler-burner unit, at not less than 120 degrees Fahrenheit under all conditions of flow, non-flow, intermittency of flow, or rate of flow.
• After extended shut-down of pipe heating, to raise pipe and contents to design temperature, reestablishing design pumpability.

"PAT" and "MIKE" agree—There's no substitute for THERMAL ELECTRIC® SYSTEMS

Oil from the tank to the burner connection is always kept at the correct temperature for a clean, safe, 100% automatic start-up, when you install a Thermal Electric System. No maintenance problems. No moving parts. Thermal Electric can be used with any make residual oil burner. The Oil Burner Thermal Electric System is listed under Reexamination Service of Underwriters' Laboratories, Inc.

FLUID SYSTEMS, INC.
1881 DIXWELL AVENUE
NEW HAVEN 14, CONNECTICUT

Gentlemen:
I'd like more information.
- ☐ 20-page handbook on Thermal Electric
- ☐ Underwriters' Laboratories Report MP 2047
- ☐ Have your representative call.

NAME ..... **TITLE** .....
COMPANY .....
ADDRESS .....
CITY ..... **ZONE** ..... **STATE** .....

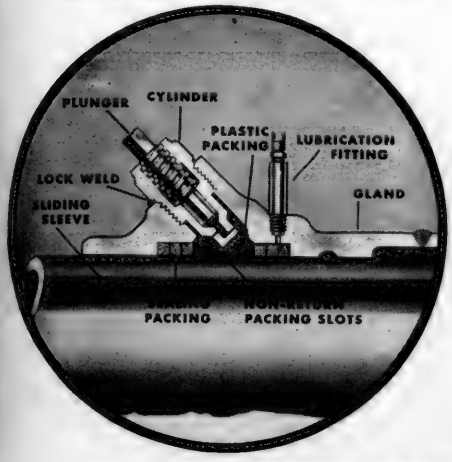
The Thermal Electric System is listed under Reexamination Service of Underwriters' Laboratories, Inc.

FLUID SYSTEMS INC.
1881 DIXWELL AVENUE • NEW HAVEN 14 • CONNECTICUT
NEW YORK • NEW HAVEN • CHICAGO

Fluid Systems INC.

new savings
for expansion joint users

Cross-section of Gun-Pakt feature. To add packing, just add a plug and turn the plunger. Note non-return packing slots at bottom of cylinder.



The Yarway Type W Gun-Pakt Expansion Joint has an improved one-piece design of body and gland and improved method of packing that provide new maintenance economies and greater operating efficiency.

Bolted joint between body and gland is eliminated; the steel body includes gland and guide. Shorter face-to-face dimensions are possible. Improved angle of packing guns makes them more accessible and *permits injection of the special plastic packing directly into packing space.*

The famous Yarway *Gun-Pakt* feature permits *addition of packing under full steam pressure. No need for costly shutdowns to repack.*

Sizes 1½" to 30", pressures 150, 300, 400 psi. Single or double types, flanged or welding ends.

For full description, write for new Yarway Bulletin EJ-1916.

20" Yarway Type W Gun-Pakt Joint with base, single type, welding ends, 8 guns.

YARNALL-WARING COMPANY
104 Mermaid Avenue
Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY

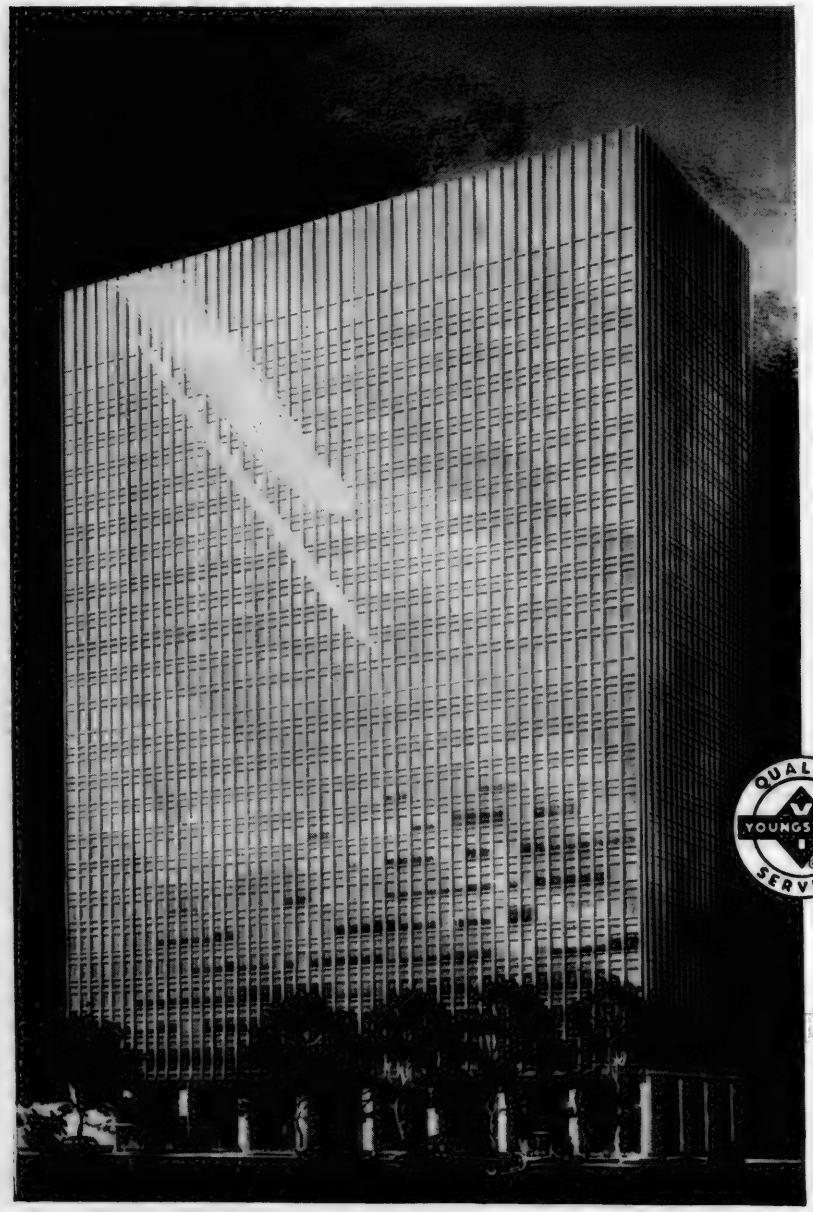
...a good way to specify expansion joints

Cleveland's "Modern as Tomorrow"

ILLUMINATING BUILDING

uses Youngstown Steel Pipe

Building Owner: 55 Public Square, Inc., New York, N. Y.
(A Vincent Astor-Brooks, Harvey & Company enterprise)
Rental and Managing Agents: Ostendorf-Morris Company, Cleveland, Ohio
Architect. Carson & Lundin, New York, N. Y.
General Contractor: George A. Fuller Company, New York, N. Y.
Structural & Mechanical Engineers: McGeorge Hargett & Associates
Consulting Mechanical Engineers: Jaros, Baum & Bolles
Heating & Air Conditioning Contractor. The Feldman Bros. Company, Cleveland, Ohio
Distributor: Grinnell Company, Cleveland



Cleveland's newest architectural beauty — this modernistic 22-story Illuminating Building — will provide much-needed air-conditioned office space for the "Best Location in the Nation". Owner of the new structure, 55 Public Square, Inc., and the architects, wisely chose Youngstown Steel Pipe to provide for a long-lived, dependable water supply system.

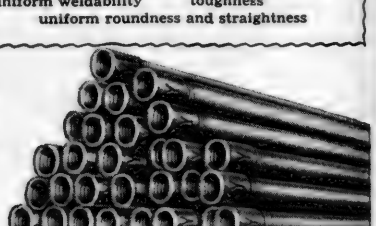
Youngstown Steel Pipe is the best pipe obtainable—anywhere. That's because it's made from our highest quality steel by men who have devoted their lives to the pipemaking business. Each and every step in Youngstown's completely integrated operations is closely quality-controlled by expert metallurgists to guarantee pipe that will meet your most exacting specifications.

Your nearby Youngstown Pipe Distributor has complete and ample stocks in all sizes. Why not call him today and discuss your requirements?

Specify Youngstown and secure these 7 Points of uniform goodness

- uniform ductility
- uniform lengths
- uniform threading
- uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

QUALITY YOUNGSTOWN SERVICE

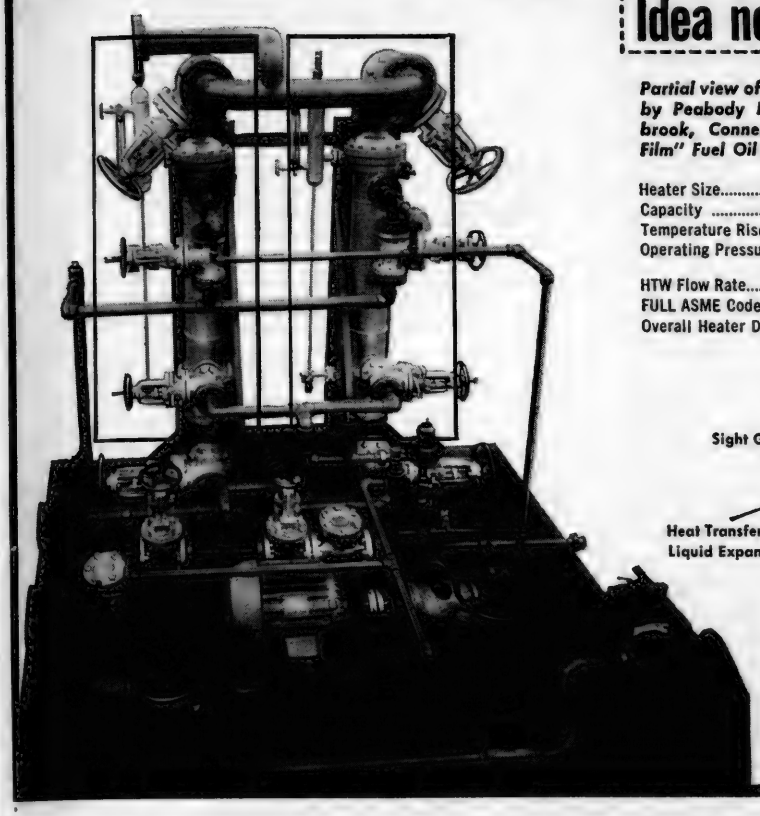


THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of
Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

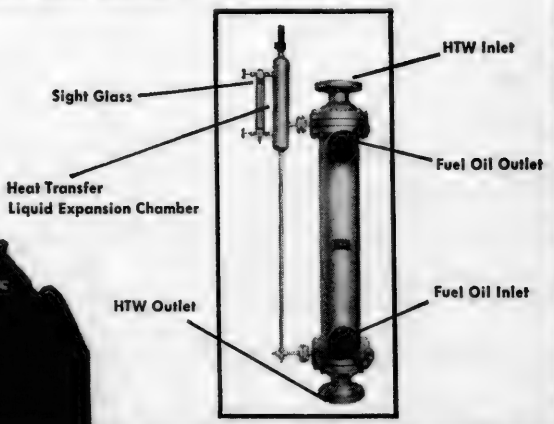
CUT ALONG DOTTED LINE AND SAVE



Idea no. 2 from Paracoil

Partial view of pump and heater set fabricated by Peabody Engineering Corporation, Glenbrook, Connecticut, utilizing two "Thermo-Film" Fuel Oil Heaters of these specifications:

Heater Size	FF-48 HTW "Thermo-Film"
Capacity	7500 lbs. No. 6 oil per hour
Temperature Rise	80°F to 210°F
Operating Pressures	300 psi, water side 315 psi, oil side
HTW Flow Rate	100 GPM at 370°F
FULL ASME Code Construction	
Overall Heater Dimensions	15" x 6'-6"



How to use High Temperature Water directly in a #6 oil heater...without danger of system contamination!

The Problem

The pre-heating of #6 fuel oil with High Temperature Water to provide adequate oil temperature and eliminate possibility of leakage of fuel oil into the HTW stream.

Leakage of fuel oil into the HTW stream would result in contamination of the system and could cause serious and costly damage to the boiler and the entire system.

The isolation of the fuel oil heaters can be accomplished by several methods. For example, the HTW stream may be passed through an evaporator to supply steam for use in a steam-type fuel oil heater. Or, the HTW stream may be passed through an intermediate water-to-water exchanger to heat a secondary water stream circulated through a water-type fuel oil heater.

In both of these systems, the HTW stream is safely isolated from the fuel oil heater by an intermediate secondary circuit. But effective as these methods are, they both require a minimum of two heat exchangers, additional space and additional connecting piping, regulators, level controls, etc.

A New Solution

Now for the first time the Paracoil "Thermo-Film" Fuel Oil Heater furnishes the optimum solution to the problem. **In a single exchanger** the "Thermo-Film" Heater provides adequate oil temperature, isolation of the HTW circuit from the oil circuit, a reduction in space requirements, simplicity of operation and substantially lower initial installation cost. A number of double tube elements are enclosed within the heater shell providing three circuits: the primary HTW circuit, an intermediate heat transfer fluid circuit, and the oil circuit.

The heat flow path is from the HTW to the heat transfer fluid to the fuel oil. In the rare event of an oil tube failure, the free oil cannot contaminate the HTW stream as it becomes trapped in the intermediate space containing the heat transfer liquid, and gives warning to the operating personnel by rising in the indicating gauge glass at the expansion chamber.

Your inquiries for Paracoil "Thermo-Film" applications to HTW systems are invited.

CUT ALONG DOTTED LINE AND SAVE

DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York • Circle 6-5650

FOR
HIGH CAPACITY,
CONTROLLED

HUMIDIFICATION

RP **Aprilaire**

AUTOMATIC-ELECTRIC HUMIDIFIERS

HIGH CAPACITY

Aprilaire Industrial Humidifiers (illustrated) are designed to provide capacity for practically any size requirements. Unit sizes up to 10 G.P.H.—can be installed singly or in a series of any number of units.

POSITIVE CONTROL

The Aprilaire introduces relative humidity as needed ...and only when needed. Automatic control eliminates possibility of lag or over-run.

FLEXIBILITY

Aprilaire industrial models are available for gas, steam or hot water heat source. Every model can be pedestal-mounted or suspended—according to individual requirements.

BACTERIA REMOVAL

The Aprilaire's entirely new principle of humidification, introducing humidity as a water vapor, provides an important plus feature—the removal of up to 70% of all bacteria in the air stream circulating through the unit.

ISOTHERMAL OPERATION

The Industrial Aprilaire has no temperature effect on the humidified air. Exhausted, humidified air is discharged at the same temperature it enters the unit.

MINIMUM MAINTENANCE

Because the only liming or water solids deposits occur on the inexpensive, replaceable evaporating pads... mechanical difficulties from these usually troublesome deposits are eliminated.

INDUSTRIAL AND RESIDENTIAL MODELS AVAILABLE–WRITE FOR COMPLETE INFORMATION

see our catalog in S PLANT ENGINEERING FILE or write for copy

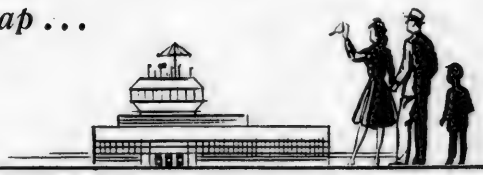
RP ... PRODUCTS OF RESEARCH

RESEARCH PRODUCTS Corporation

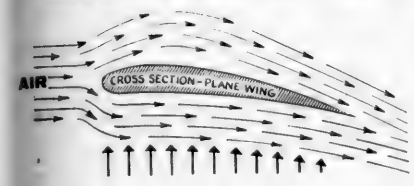
Dept. 913, Madison 10, Wisconsin

HOW THIS MODERN STEAM TRAP UTILIZES PRINCIPLE OF AIRPLANE LIFT!

New application of an old principle produces totally different type of steam trap . . . of great simplicity and effectiveness



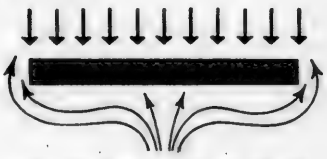
THIS GIVES AN AIRPLANE LIFT



Greater speed of air over curved upper wing surface creates lower pressure over this area (Bernoulli's Law) . . . resulting in **lifting** force.

THIS SAME PRINCIPLE USED TO CLOSE SARCO TD STEAM TRAP VALVE

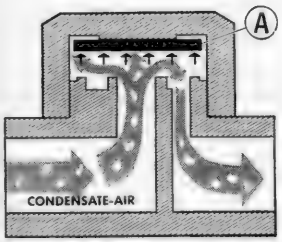
Valve is a simple hardened stainless steel disc.



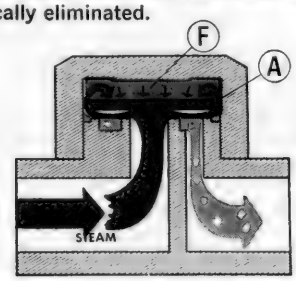
High velocity steam jet across bottom of valve disc creates low pressure area — resulting in **downward** force.

ONLY SARCO TD USES THIS UNIQUE OPERATING PRINCIPLE

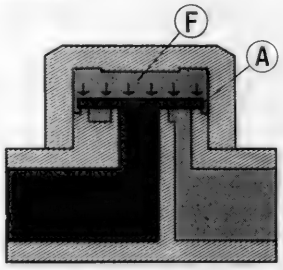
Result: Extreme simplicity—no valve mechanism—maintenance practically eliminated.



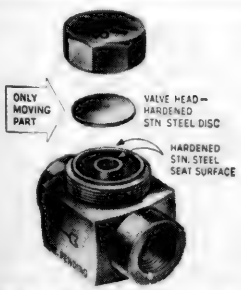
1. Inlet pressure raises disc "A" from seat . . . immediate discharge of air and condensate at steam temperature.



2. Steam follows condensate and the high velocity jet across bottom of disc "A" creates low pressure area (Bernoulli effect) . . . jet is deflected into chamber "F" where it builds up pressure by re-compression and this pressure acts on top of disc "A" . . .



3. Pressure in chamber "F", acting on full top area of disc "A", exceeds force of incoming steam and low pressure area under disc . . . and immediately forces it down, closing inlet. As condensation decreases pressure in chamber "F", disc rises and steps 1 or 2 repeat.



Small size . . . large capacity

Only 3 parts . . . all stainless steel. Sizes ⅜ to 1"—each body is as small as a tee fitting! Capacity is determined not by a bulky body but by the effective orifice, valve action, pressure drop and condensate temperature.

A few of many advantages

* *Practically no maintenance*—no valve mechanism, no narrow channels. Trouble-free, simple design.

* *Cuts trap inventory*—one large capacity seat for all pressures . . . for heavy, light, or no condensate load.

* *Self-adjusting for pressures 10 to 600 psi*—not a single change or adjustment required.

* *Operates perfectly when pressure fluctuates*—throughout full pressure range.

SEE FOR YOURSELF

We will gladly send you a Sarco TD Steam Trap and strainer for 60-day trial. No cost or obligation. Advise size —⅜, ½, ¾ or 1"—and application. Sarco Company, Inc., 635 Madison Ave., New York 22, N. Y.

2204-C

SARCO Thermo-Dynamic STEAM TRAP

THE MODERN TRAP THAT IS MAKING STEAM TRAPPING HISTORY!

1

FOLLOW THROUGH ENGINEERING.
From drafting board to final product, a single policy dictates Jenn-Air engineering: Jenn-Air exhausters must be better designed. Primary objective is—how well can we make the products? . . . not how cheaply or how quickly.

2

FOLLOW THROUGH MANUFACTURING.
Jenn-Air exhausters are constructed of ageless spun aluminum and stainless steel—motors lubricated for 10 years of normal operation. Each unit must pass final scrutiny of exacting vibronic Eye to guarantee minimum vibration—low noise level.

3

FOLLOW THROUGH SERVICE.
Jenn-Air's sense of responsibility never diminishes. Fifty-two national sales offices with 66 warehouse stocks—field engineers everywhere—provide the fastest over-night service throughout the U.S.A., the easiest-to-obtain consultation.

WHY IS JENN-AIR BETTER THAN "OR EQUAL"?

FOLLOW THROUGH ENGINEERING—MANUFACTURING—SERVICE MAKE THE BIG DIFFERENCE IN JENN-AIR POWER EXHAUSTERS

In the specification of materials or products that go into a building a commonly-used term is "or equal." Because of the principles behind Jenn-Air Quiet-Tested roof and wall exhausters, we like to believe there is *no equal* to Jenn-Air. The Jenn-Air creed demands:

Jenn-Air FOLLOW THROUGH has no "or equal."

JENN-AIR PRODUCTS COMPANY, INC.
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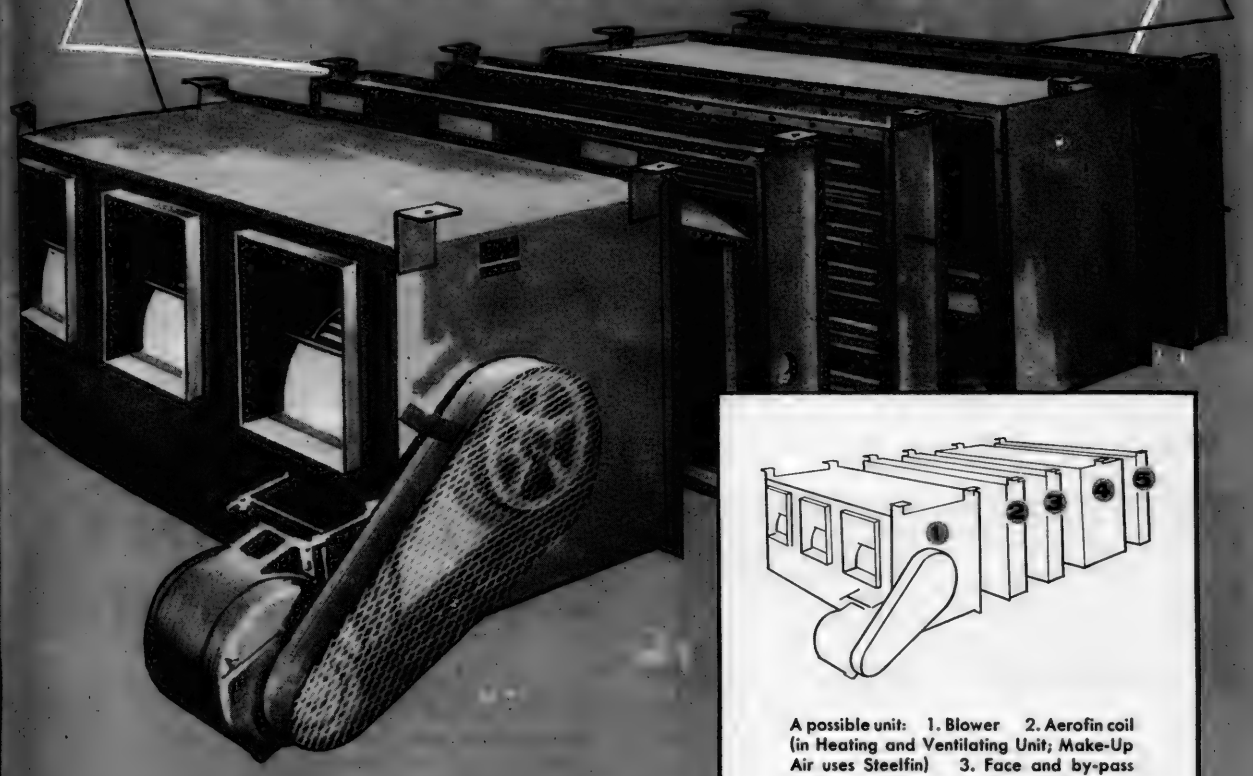
... the Make-Up AIR family

proudly presents a new addition ...

HEATING AND VENTILATING UNIT



A possible unit: 1. Blower 2. Aerofin coil (in Heating and Ventilating Unit; Make-Up Air uses Steelfin) 3. Face and by-pass 4. V-type filter 5. Shut-off damper.

... versatile, all-purpose

interchangeable components for Make-Up AIR and general ventilation applications ...

The Make-Up AIR, using Steelfin coil, now adds to its family a heating and ventilating unit, using Aerofin copper coil. All sections are individually supported, and are removable for maintenance or replacement. Nine basic blower sections are available, in any rotation. Write now for bulletin 567.

nyb

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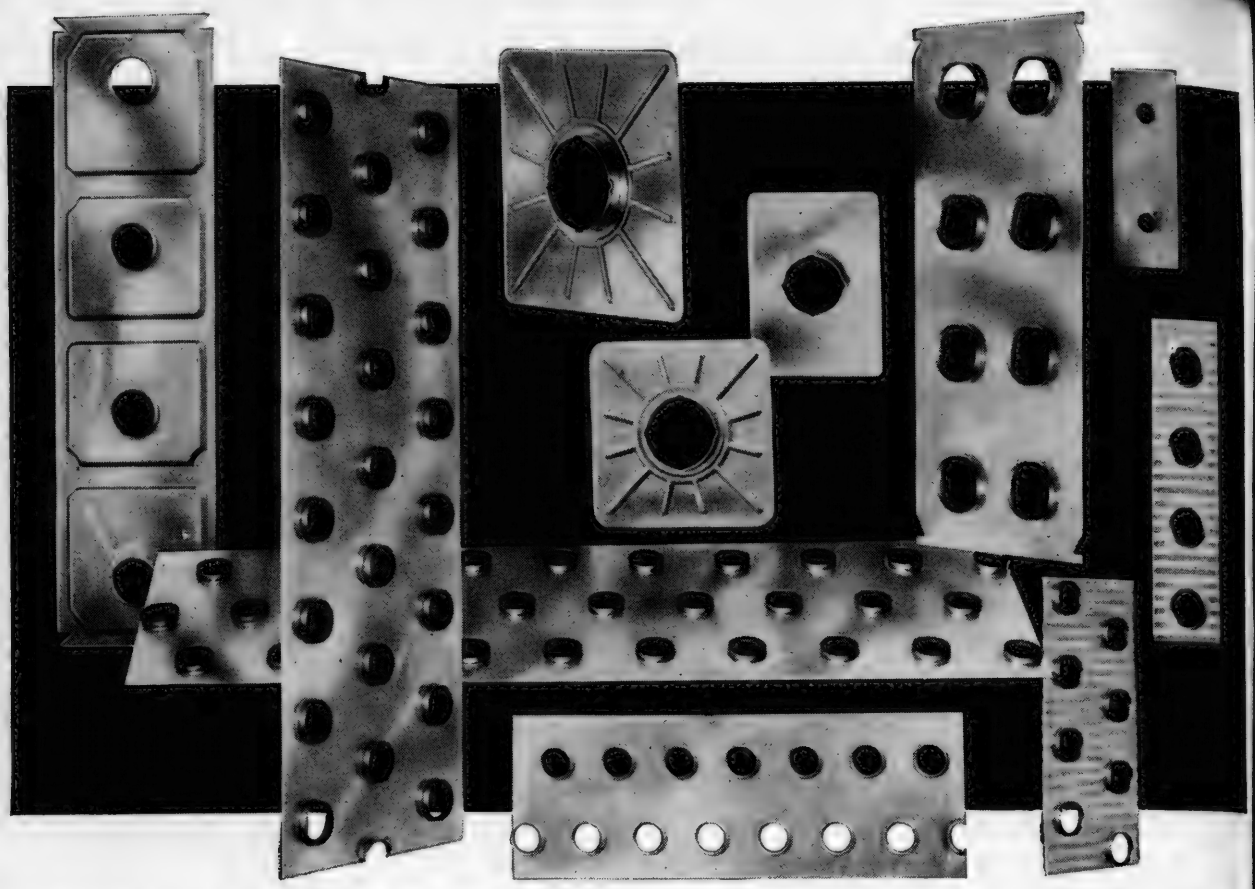

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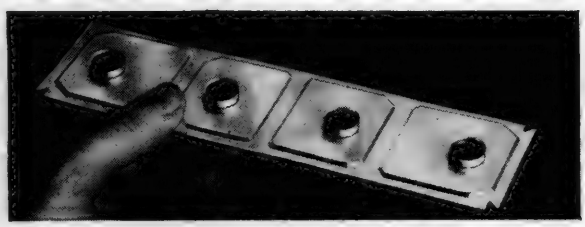
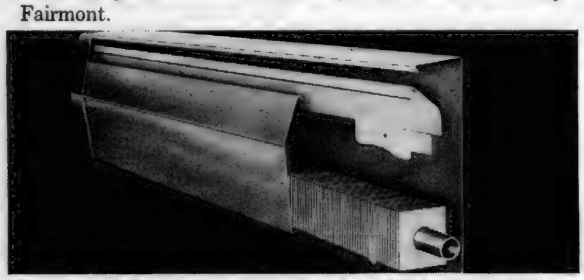


For perfection in the formation of fin collars, to assure excellent mechanical and thermal bonding to tubing, ***EMBASSY*** uses wrought aluminum 1100 alloy, .010″ thick, made by Fairmont.



Baseboard heater section made by ***EMBASSY STEEL PRODUCTS, INC.***, Brooklyn 8, New York, employs 60 die-formed fins per foot made of Fairmont aluminum.

To meet widely differing specifications in the manufacture of heat-transfer surfaces such factors as size, shape, thickness, perforation and spacing of fins are given proper evaluation by design engineers. Of equal importance is the aluminum fin's ability to withstand rapid mechanical forming in production and assembly without developing cracks or buckling, its ability in service to withstand temperature, moisture and mechanical attacks.

With an enviable reputation for rigid quality control and specialized attention to manufacturers' requirements for uniform wrought aluminum alloy 1100 and 3003 sheets and coils, Fairmont enjoys the continuing preference of foremost heat-transfer surface manufacturers. Write or call today for details.

Sales offices in principal cities

FAIRMONT ALUMINUM COMPANY

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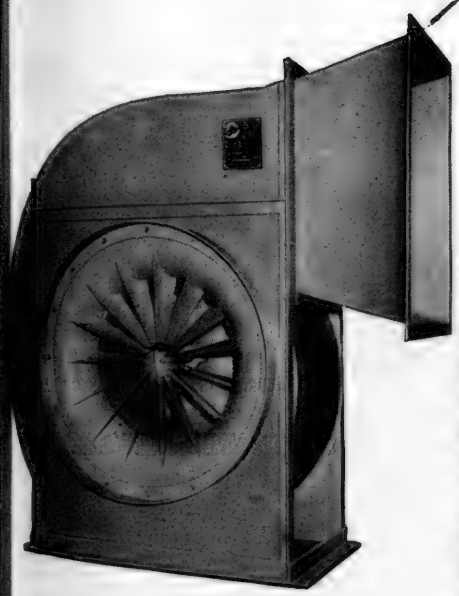
FALCO

Figuring on a HIGH PRESSURE SYSTEM?



CONSIDER THE ADVANTAGES OF THE "BUFFALO" TYPE "BLH" FAN ENGINEERED SPECIFICALLY FOR PRESSURE REQUIREMENTS OF 3¾" AND ABOVE

APPLICATIONS: Class II-IV, conduit air conditioning, heavy industrial services, mechanical draft.

MECHANICAL EFFICIENCY: 86%, over a broad range.

PERFORMANCE: stable from free delivery to shutoff.

NOISE LEVEL: unusually low, due to inlet-to-outlet streamlining and factory-balanced wheel.

INLET: air enters wheel via smoothly curved inlet bell and matching wheel flange. Cantilevered inlet vanes "spin" air in direction of wheel rotation — Air entrance is stabilized even when inlet conditions are unfavorable. Inlet collar simplifies duct connection.

WHEEL: Smooth backward-curve blades welded to deep-drawn inlet flange and back plate for rigidity and strength. Ample, diverging housing scroll for free air passage. Wheel sizes 18¼" to 98¼" dia.

DIVERGENT OUTLET: eliminates outlet turbulence by providing gradual static conversion in duct.

"Q" FACTOR: the built-in Quality which provides trouble-free satisfaction and long life in every "Buffalo" Fan.

Write for Bulletin F-200 and recommendations on your air handling problem.

BUFFALO FORGE COMPANY

BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
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SAFE!

New Glasfloss *Safety-Grille* Filters have been thoroughly tested in industrial and commercial installations. Users report complete satisfaction in all types of high-velocity, high moisture-content and extra-dirty applications. These new filters eliminate danger of cut hands and wrists from sharp or broken metal grilles. New chipboard grille is stronger, resilient when bent, provides effective filtering in all types of installations.

Glasfloss* fiber glass Safety-Grille* filter

TRADE MARK

stronger . . . tested in service . . . UL approved

Now, Glasfloss Fiber Glass Filters have a new design. The old-type metal grille has been replaced completely by a new chipboard grille, providing you with a filter that is safer to handle, stronger in design, and highly efficient.

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3. **EASIER DISPOSAL**—Used Glasfloss *Safety-Grille* Filters can now be rolled up for quick, simple trash disposal. No more stiff metal grilles!
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6. **APPROVED**—Glasfloss Fiber Glass *Safety-Grille* Filters have been approved by Underwriters' Laboratories, Inc.

Don't wait! Test these new filters in your own plant or building now! Get top filtering results—and all these extra features—with Glasfloss. The new Glasfloss Fiber Glass *Safety-Grille* Filters are now available in a complete range of sizes from your local distributor or your nearby PPG Warehouse.

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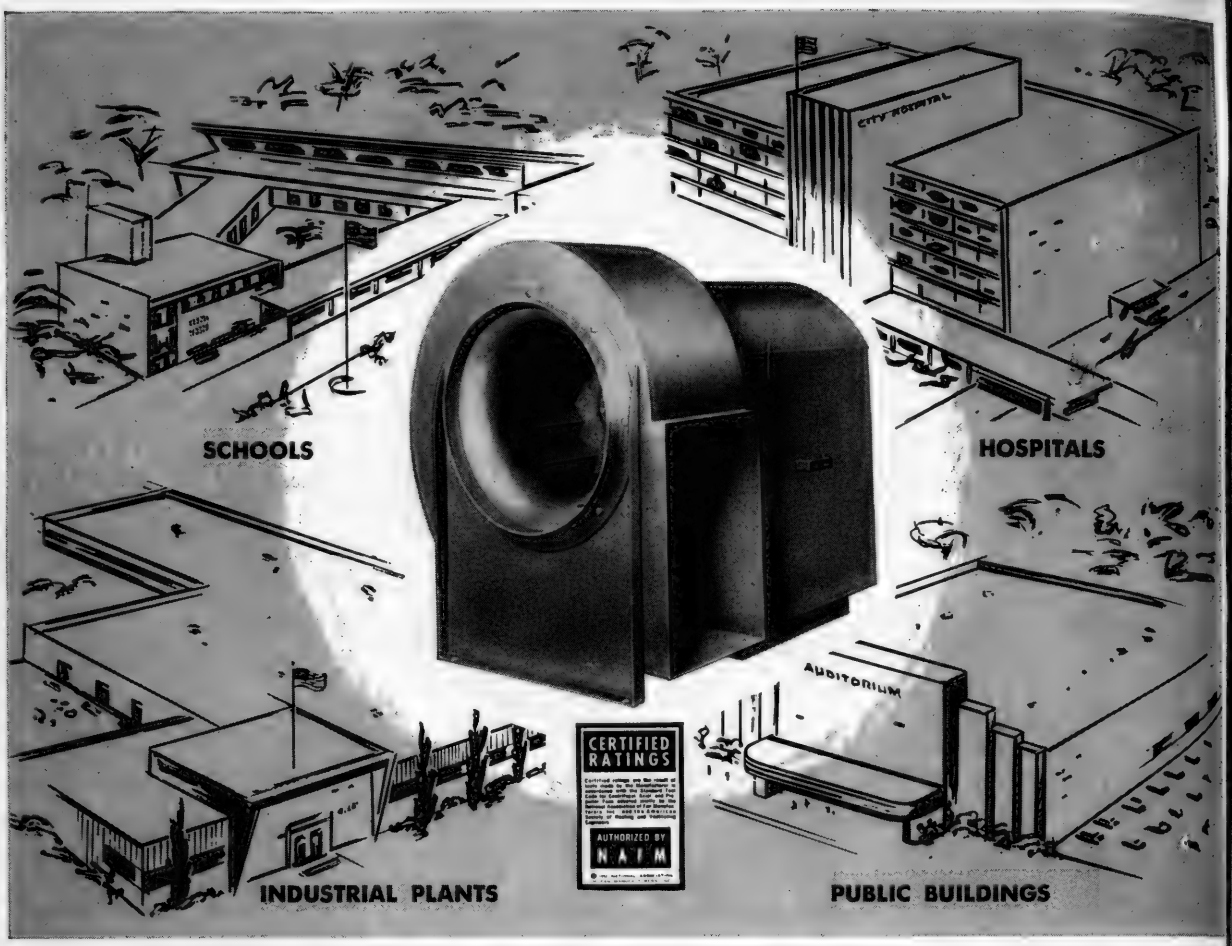

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Peerless blowers meet and excel industry standards. They have been thoroughly tested according to test codes. Thousands of them are providing economical, continuous ventilation in installations all over the country.

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THE *Peerless-Electric*® COMPANY

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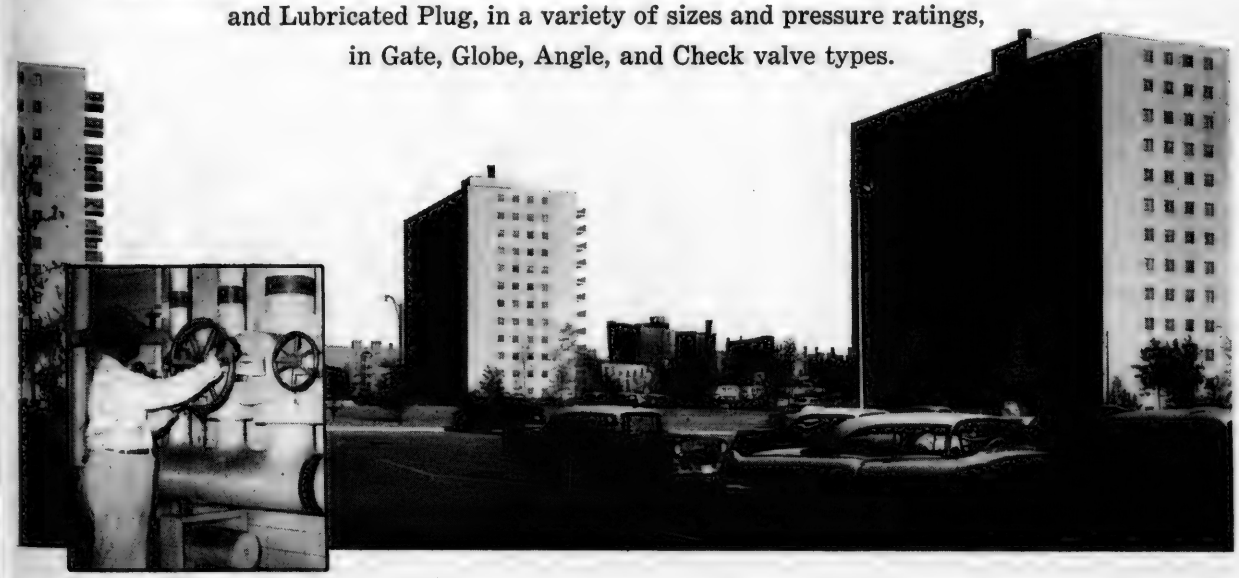
Chicago's new 100-acre development, to house about 2000 families, makes the facilities of its streamlined shopping center available to additional thousands in the surrounding area. Quality is the keynote throughout the construction of Lake Meadows and literally hundreds of Walworth Valves and Fittings have been specified and installed in the vital plumbing, heating, ventilating and air conditioning systems. Valve requirements have been so broad that almost all of Walworth's complete lines are represented—Steel, Iron, Bronze and Lubricated Plug, in a variety of sizes and pressure ratings, in Gate, Globe, Angle, and Check valve types.



Cabie Maxwell, Stationary Engineer, operating a Walworth Iron Gate Valve on main steam lines to various buildings at Lake Meadows.

OWNER: New York Life Insurance Company
ARCHITECT: Skidmore, Owings & Merrill
BUILDER: Turner Construction Company
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Air-conditioning the ultramodern

Bank of the Southwest

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Consulting Engineer: H. E. BOVAY, JR.
General Contractor: W. S. BELLOWS CONSTRUCTION CO., HOUSTON, TEXAS
Mechanical Contractors: BARBER, INC., and STRAUS-FRANK CO., HOUSTON, TEXAS

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USS NATIONAL Seamless Pipe is consistently the number one choice of engineers and contractors throughout the country for air-conditioning, heating and power installations. Its ability to render efficient, trouble-free service under all types of pressure and temperature conditions has given NATIONAL Seamless a reputation for safety and dependability excelled by no other pipe. For further information or assistance with your pipe problems, get in touch with us.

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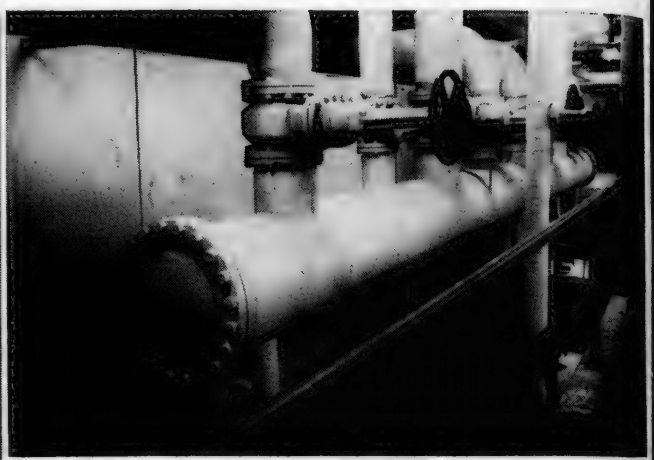
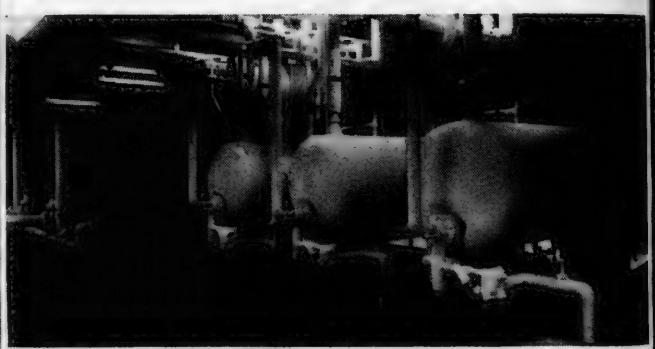
NATIONAL PIPE USS



20-inch drop header with 10-inch boiler leads on the steam heater system take-off from the boilers. All NATIONAL Seamless.



4-inch domestic hot water piping to generators and surge tanks. All NATIONAL Seamless.

12-inch NATIONAL Seamless Pipe from tower to main condenser and chill water pumps and gear boxes.

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heat-x

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Perpetuating fine product reputation is the Dunham-Bush sales engineer. His technical skills are ever available to aid you in three major industries.

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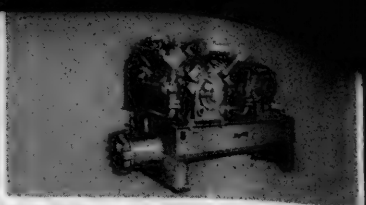
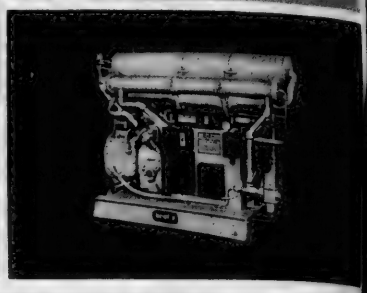
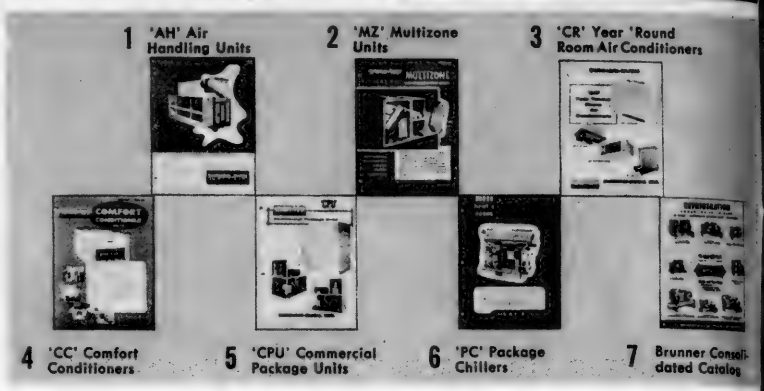
Whatever your requirements in Air Conditioning equipment, there's a dependable Dunham-Bush unit to satisfy the specification. 'AH' Central Station Air Handling Units, 'MZ' Multi zone Units, 'CR' Room Air Conditioners. 'CC' Comfort Conditioners, 'CPU' Pre-Engineered Commercial Package Units, Direct Expansion, Water, Steam Coils, Cooling Towers, Evaporative Condensers, Heat-X Package Chillers to 100 tons, Brunner Condensing Units to 100 tons. These are the "basics" from the Dunham-Bush line to make your Air Conditioning jobs trouble-free, simple to specify. Request catalogs by number.



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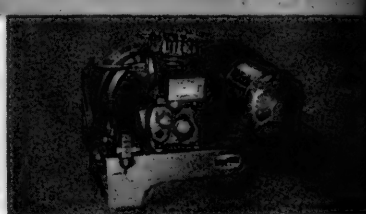

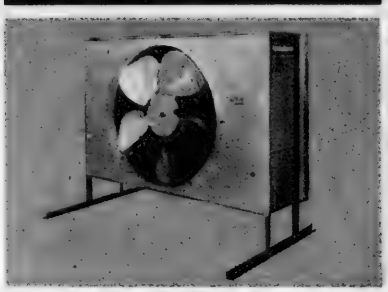

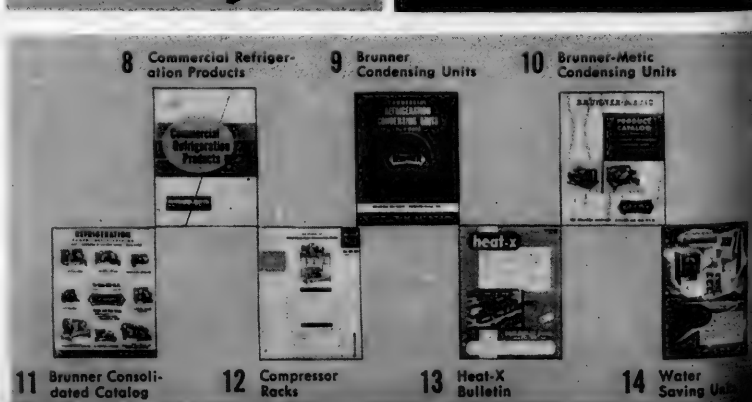

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Dunham-Bush gives you "supermarket shopping" for ALL your heating needs. Not one but every heating product you need (except the boiler) is manufactured by Dunham-Bush.

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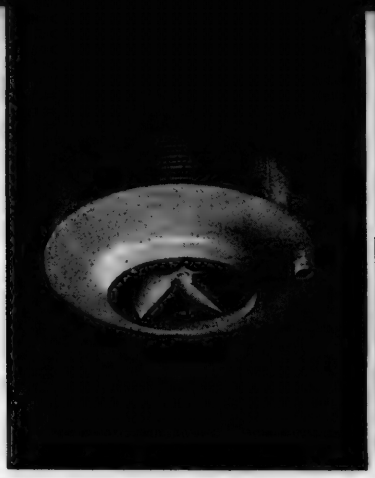

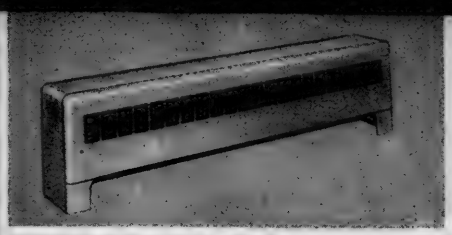

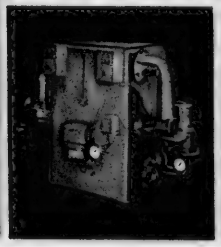

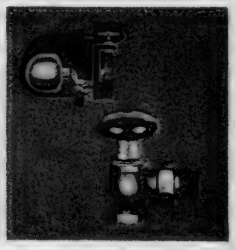

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Over a century and a half of heat transfer experience is available to help solve *your* specialized heat transfer problem.

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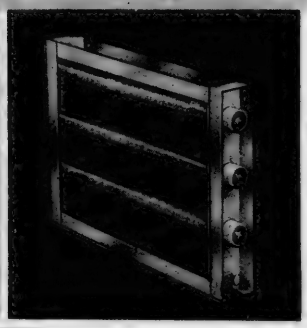

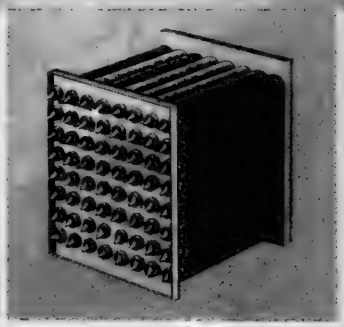

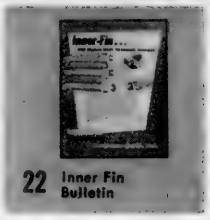

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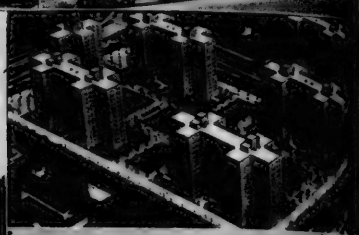
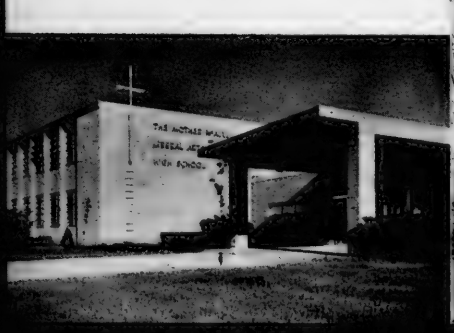
EVERYWHERE





FACTORIES

WEST HARTFORD, CONN.	RIVERSIDE, CALIFORNIA	MICHIGAN CITY, INDIANA	MARSHALLTOWN, IOWA	UTICA, N. Y.
Main Office and Factory 179 South Street	1850 Massachusetts Ave.	506 E. Second St.	811 E. Main St.	1821 Broad St.

SUBSIDIARIES

HEAT-X, INC.	THE BRUNNER CO.	DUNHAM-BUSH (Canada) LTD.	BRUNNER CORPORATION	DUNHAM-BUSH, LTD.
Brewster New York	Gainesville Georgia	140 Wendell Ave. Toronto 15, Ontario	(Canada) LTD. Port Hope, Ontario	Lombard Rd., Merton London, S. W. 19, England

SALES OFFICES

WEST HARTFORD, CONN.	NEW YORK, N. Y.	CHICAGO, ILLINOIS	RIVERSIDE, CALIFORNIA	MICHIGAN CITY, INDIANA
179 South Street	250 East 43rd St.	317 West Huron St.	1850 Massachusetts Ave.	506 E. Second St.

MARSHALLTOWN, IOWA	DECATUR, GEORGIA	HOUSTON, TEXAS	SAN FRANCISCO, CALIF.	DETROIT 21, MICH.	UTICA, N. Y.
811 E. Main St.	215 Church St.	2015 South Shepherd Drive	760 Market Street	16801 Wyoming Ave.	1821 Broad St.

JENKINTOWN, PENN.	ST. LOUIS 17, MO.	MINNEAPOLIS, MINN.	TORONTO, CANADA	LONDON, ENGLAND
301 York Road	2211 Brentwood Blvd.	2649 Lyndale Ave. South	Dunham-Bush (Canada) Ltd. Brunner Corp. (Canada) Ltd. 140 Wendell Ave.	Dunham-Bush, Ltd. Lombard Rd., Merton London, S. W. 19, England

DUNHAM-BUSH, INC., West Hartford 10, Connecticut

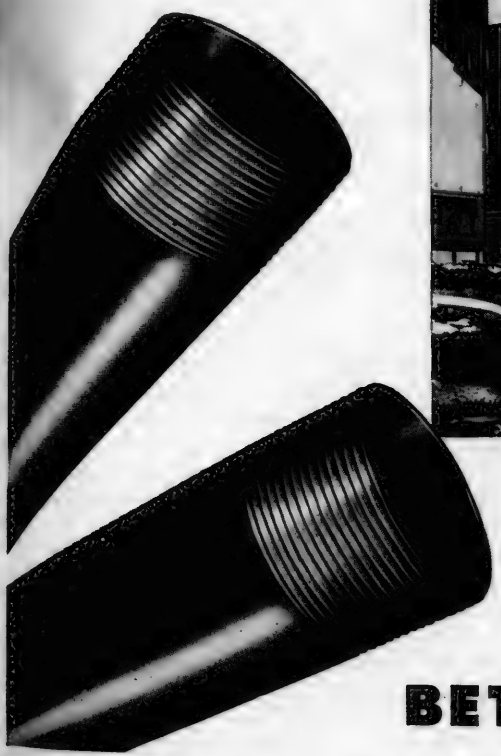
EXPORT DEPT: 179 SOUTH STREET, WEST HARTFORD, CONN. • CHapel 9-8671 • CABLE: BUSHEATX

New Office Building in Baltimore Has Beth-Co-Weld Piping

This attractive new structure is the Commercial Credit Building, the first major office building erected in Baltimore in a quarter-century. The 20-story building is faced with granite and aluminum, and has a basement garage for 250 cars. Beth-Co-Weld steel pipe is used for the plumbing and heating piping, as well as for the conduit for the electrical system.

Beth-Co-Weld steel pipe is ideal for all kinds of general-purpose piping because it's so strong, so sound. And with Beth-Co-Weld, installations proceed at a steady pace because it's such easy pipe to cut, thread and weld.

Beth-Co-Weld comes black and galvanized, standard weight and extra-strong, in all sizes from ½ in. through 4 in. It is regularly furnished in 21-ft lengths, plus or minus 1 in., and in random and cut lengths. The next time you need pipe, ask your jobber for Beth-Co-Weld.



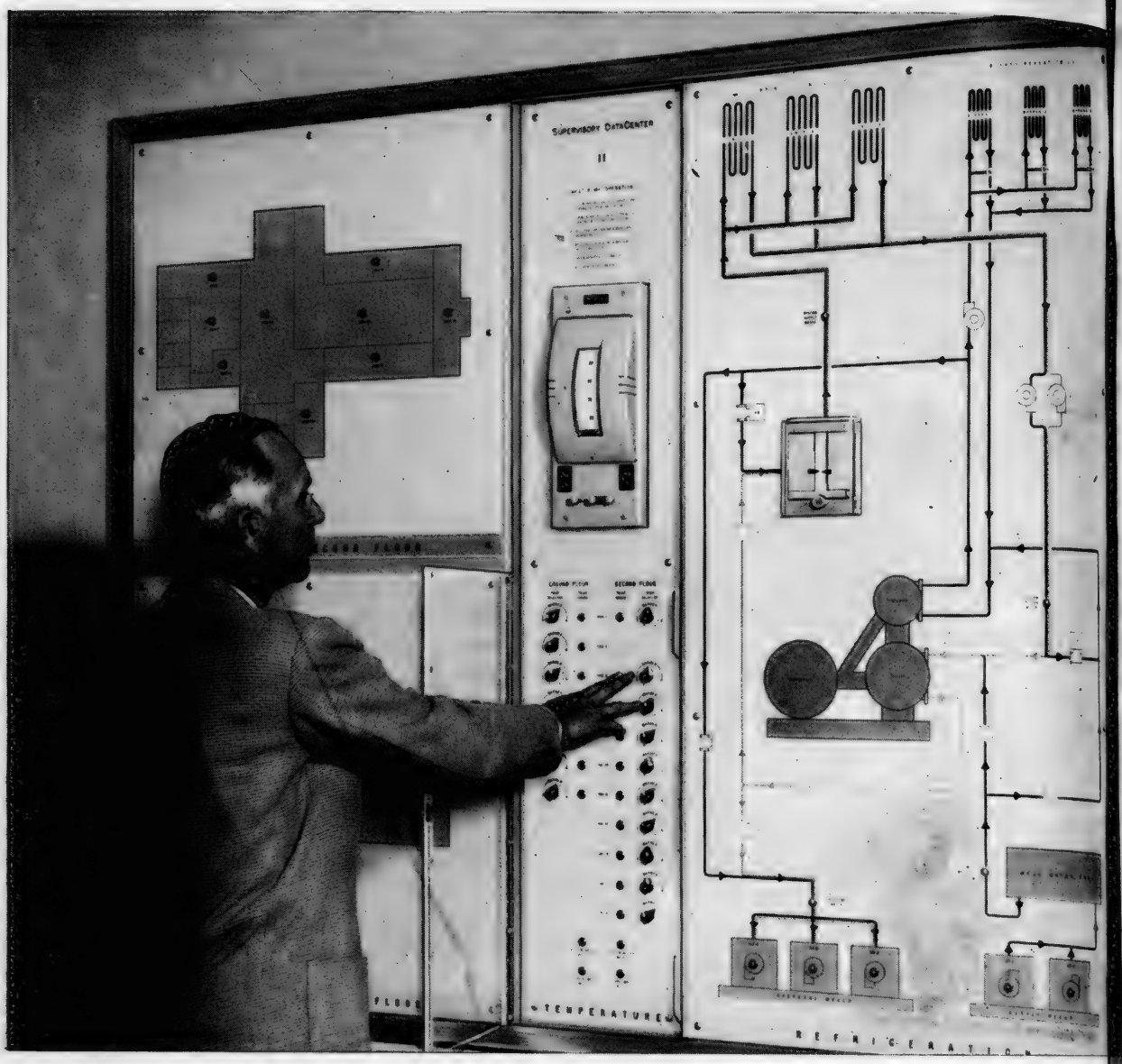
Plumbing and Heating, Air Conditioning and Electrical Contractor: Riggs Distler & Co., Inc., Baltimore. *Pipe Distributor:* Noland Co., Washington Branch.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



True Automatic Air Conditioning-

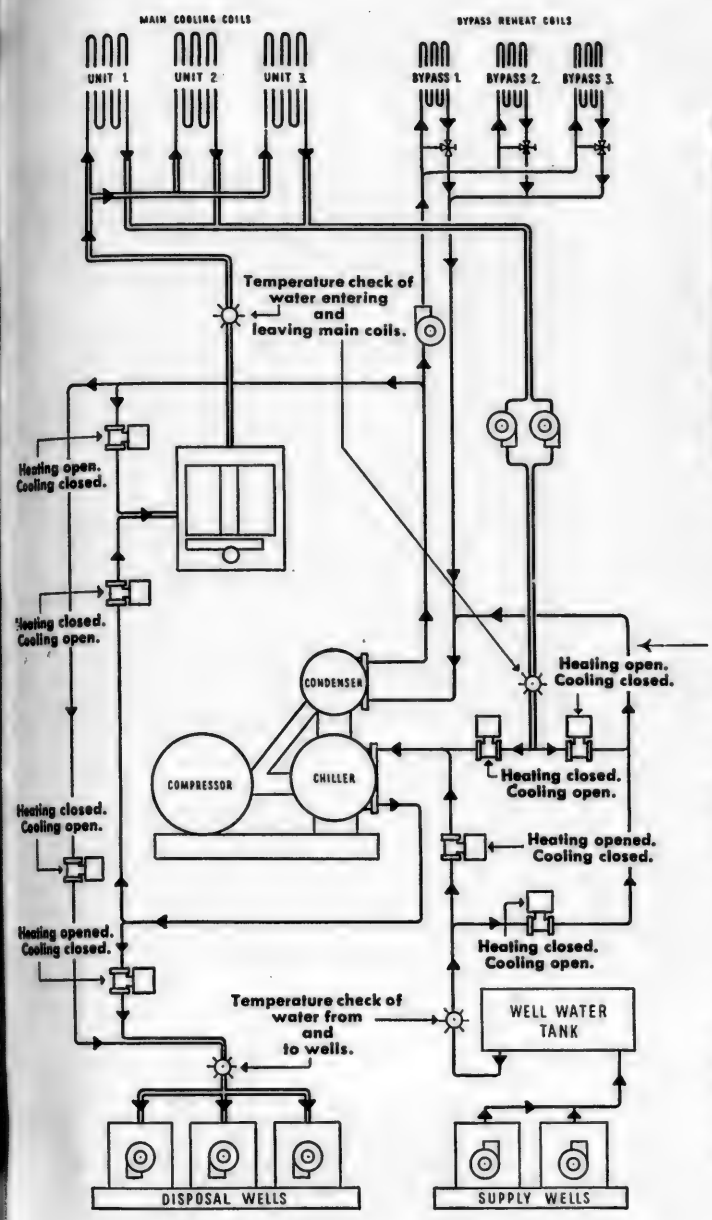
Architect: Eliot C. Fletcher, Tampa;
Engineer and General Contractor:
Stone & Webster Engineering Corporation of Boston;
Air Conditioning Contractor:
Tampa Armature Works, Inc., Tampa

INSTALLATION of the Honeywell Supervisory Data Center in the new Tampa Electric Company building lobby illustrates well how central control can be used with a 200-ton centrifugal refrigerating system that furnishes both heating and cooling.

Temperatures in 17 large public zones can be read and adjusted quickly at the panel; a locked glass cover prevents tampering.

Individual room thermostats in private offices give each occupant personal temperature selection.

In addition, operation of the entire heat pump system can be checked at any time at the panel. A miniature instrument allows output of the refrigeration compressor to be noted and adjusted.



New use for electric power—heating and cooling with a heat pump—is demonstrated dramatically by prominent display of the Supervisory DataCenter control panel in the lobby of the Tampa Electric Company building.

Heat pump operation. Tampa Electric Company heat pump system has three water circuits. (1) A circuit from the supply wells through the chiller (heating cycle) or condenser (cooling cycle) to the disposal wells. (2) A closed circuit from the main cooling coil to the condenser (heating cycle) or the chiller (cooling cycle). (3) A circuit from the condenser (cooling cycle) to the bypass reheat coils. During cooling cycle, water from the wells passes through condenser where it picks up heat. This warmer water then returns to the disposal wells. Water from main cooling coils is cooled by the chiller in a closed loop. During heating cycle, water from the wells gives up heat in the chiller and this cooler water is returned to the disposal wells. Water from the main coils is heated by the condenser in a closed loop. The difference in the temperature of the water entering and leaving the main cooling coils is a measurement of the heat being removed or added to the circulated air. The difference in the temperature of the water leaving and returning to the wells is a measurement of the amount of heat being removed from or added to the well water. The output of the compressor is controlled by a Honeywell miniature indicating-controller to maintain a temperature of 45° for cooling and 105° for heating of the supply water for the well coils. For further explanation of system operation, refer to notes on diagram at left.

ng-...with Honeywell Supervisory DataCenter

Greater operating efficiency with less personnel time . . . longer equipment life . . . operational savings that liquidate cost . . . attractive display of your engineering design—all this can be accomplished with the centralization made possible by the Honeywell Supervisory DataCenter. More than 100 of these installations are now in operation throughout the country.

All components of the DataCenter are manufactured by Honeywell. And *only* Honeywell manufactures pneumatic, electric and electronic controls and instruments.

For further information about the DataCenter and other Honeywell control concepts, call your local Honeywell office. Or if you prefer, write to Minneapolis-Honeywell, Dept. HV-11-143, Minneapolis 8, Minnesota.

For news about another major Honeywell contribution to air conditioning, turn the page.——→

Who said dirt cheap?

Hospitals have a special need for air that's cleaned electronically. In operating rooms, nurseries, emergency rooms—in fact, throughout the hospital—it cuts down on airborne germs, giving important help in lowering the infection rate.

Many manufacturers of precision products find electronically cleaned air a near-essential to efficient production. It also eases maintenance problems caused by airborne dirt; and it keeps nuisance dirt off desks and files in office areas.

*New Honeywell Electronic Air Cleaner removes 6 times more costly dirt than mechanical filters**

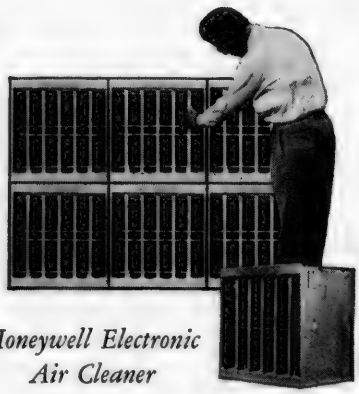
IN ADDITION to the cases shown above, most soiling of your client's work surfaces, walls, fixtures and merchandise is done by airborne particles less than 1/25,000 of an inch in size.

Particles much smaller than these—including the bacteria and viruses that cause many respiratory ills—can be removed by Honeywell's new Electronic Air Cleaner.

It is an impossible job for the mechanical type filter to remove oil smoke, fumes, tobacco smoke and much of the dust and fly ash that fall into this microscopic class of contaminants. And these are the ones with the greatest staining power.

The new Honeywell Air Cleaner's wide range of protection offers a scientific way to cut the high costs of cleaning, soiled merchandise, mechanical failures and absenteeism by trapping airborne dirt *before* it has a chance to steal your client's profits.

Your next job, whatever it is, can probably benefit from a Honeywell Electronic Air Cleaner. Specify it with confidence; the advantages more than pay for installation. For complete information, call your local Honeywell office or write Minneapolis-Honeywell, Dept. HV-11-268, Minneapolis 8, Minnesota.



Honeywell Electronic Air Cleaner

To aid the engineer—Honeywell makes a complete range of Electronic Air Cleaners for any type of air conditioning or ventilating system. Number of cells is determined by amount of air handled by the system. *Module construction* makes installing and servicing easy. Sales and service aid available in 112 Honeywell offices across the nation.

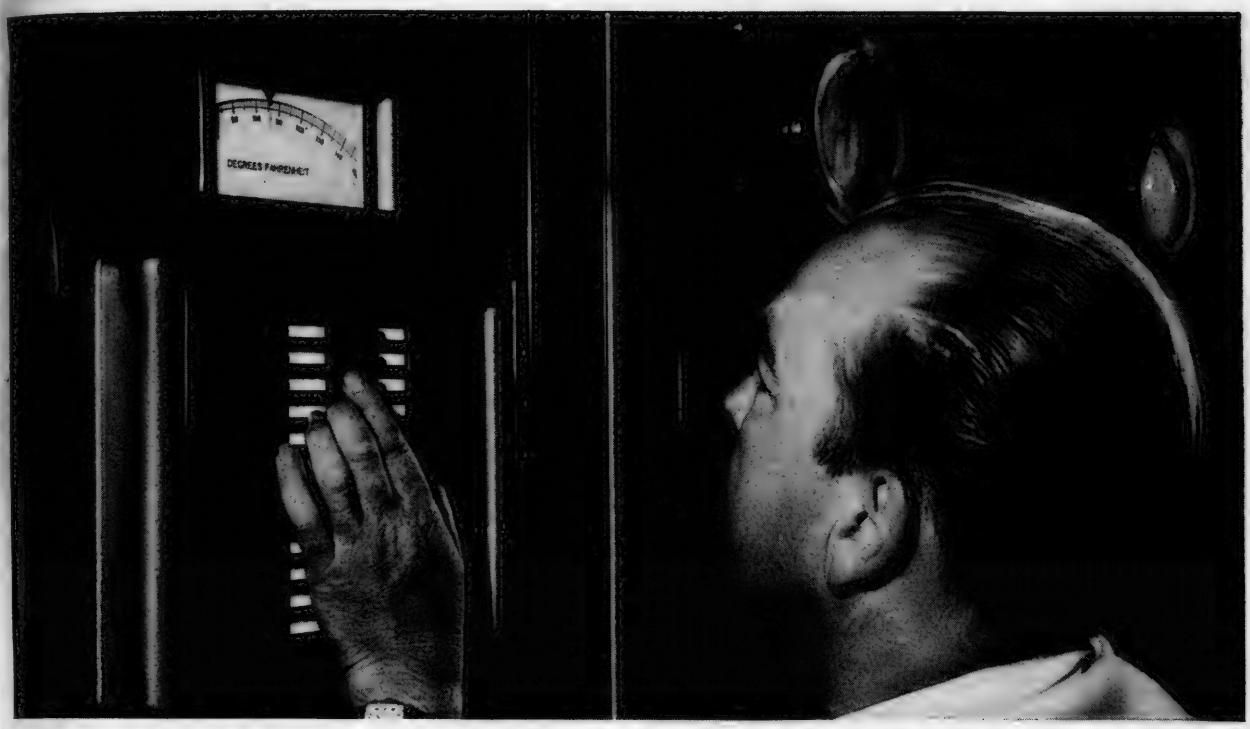
Honeywell

First in Controls

**According to the National Bureau of Standards tests, electronic air cleaners remove at least 90% of the dirt particles causing the greatest staining, while ordinary mechanical filters remove only about 15%.*

Money-saving way to watch temperatures!

Honeywell Temperature Monitoring System checks temperatures in an entire building from one location



Pushbutton efficiency in temperature reading. Engineer pushes button on door of indicator, reads corresponding temperature on the dial above. Low voltage wiring connects instrument panel to sensing element in each thermostat.

Saves time—work—reduces maintenance cost!

THIS HONEYWELL Temperature Monitoring System enables the operating engineer to read the temperature at any point in the system simply by pressing a button.

He can check instantly the temperatures of private offices, zones on each floor, outside air, chilled water lines, hot water lines or points throughout the fan system, thereby saving hours spent visiting each location. Any number of points can be connected to the system. And because the sensing elements for the indicator are located right in the thermostats, there's no need for dual installation.

Makes Records as Needed!

At little extra cost, a Honeywell Systems Analyzer can be added.

This, connected by a plug-in-jack assembly using the same wiring and sensing elements as the indicator, records on a 12-inch wide strip chart the readings for any point or combinations of points. Recordings can be made as needed, disconnected when not needed.

For further information, call your local Honeywell office. Or write to Minneapolis-Honeywell, Dept. HV-11-268, Minneapolis 8, Minn.

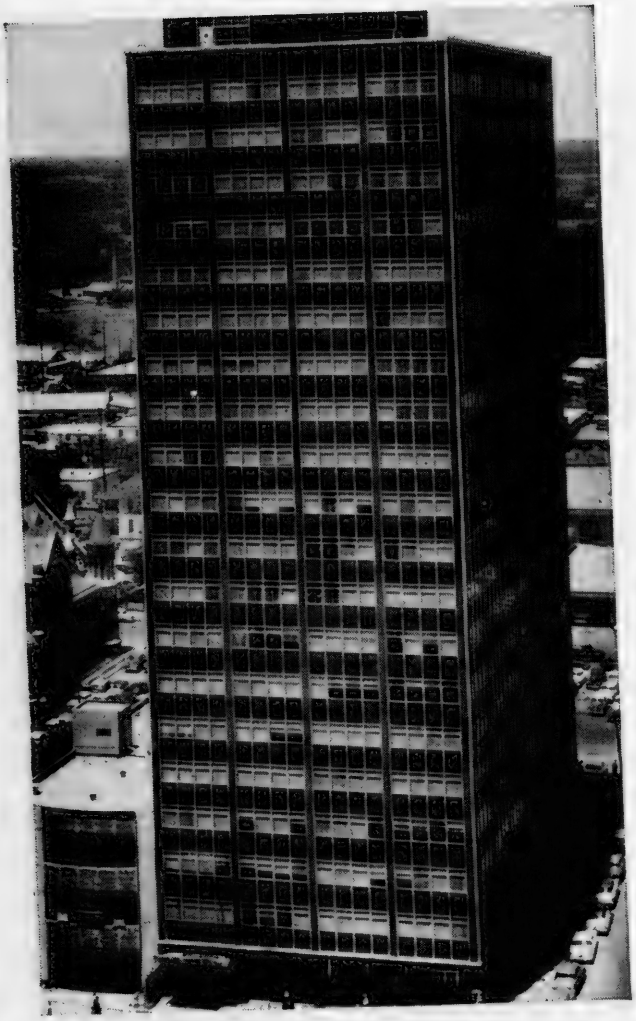
Plug-in-jack assembly gives new versatility to systems analyzer. Engineer uses this assembly to plug chart recorder into point or any combination of points he wants recorded, gets record for any period of time.

Multipoint Strip Chart Recorder, available with from 2 to 20 channels, is the recording instrument of the analyzer. It keeps easy-to-read records of system's check points. Each point is identified by a number and different color.

Honeywell

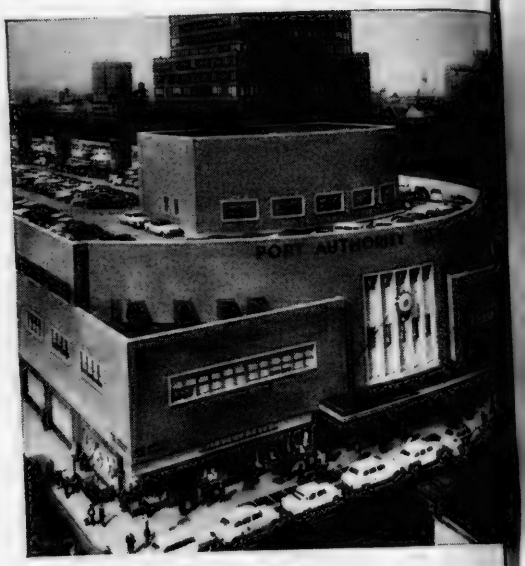
First in Controls

You'll find American Blower Air C



Beck Building,
Shreveport, La.

...because American Blower offers a complete line of air-conditioning products designed engineered, and manufactured to work TOGETHER



Port Authority Bus Terminal,
New York, N. Y.

Sheraton Hotel,
Philadelphia, Pa.

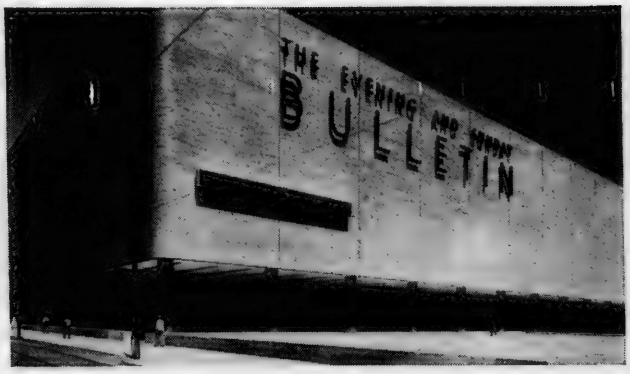
Great Plains Life Insurance
Building, Lubbock, Tex.

Mile High Center,
Denver, Colo.

Sunray Building,
Tulsa, Okla.

Conditioning wherever you go

Mondawmin Shopping Center,
Baltimore, Md.



Evening and Sunday Bulletin Building,
Philadelphia, Pa.

Standard Brands Building,
New York, N. Y.

Federal Office Building,
New Orleans, La.

WHETHER it's a large-scale central or zone system—or a system for a smaller store, showroom, or industrial plant — American Blower has the right air-conditioning and refrigerating equipment for your business. Buying from a single source gives you a balanced system, pinpoints responsibility for quality and performance, saves you time and money. So, if air conditioning is in *your* plans, get in touch with our nearest branch for product information. Or write: American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

AMERICAN BLOWER

Division of AMERICAN-Standard

QUALITY PROTECTS YOUR INVESTMENT... AMERICAN-Standard QUALITY IS AVAILABLE AT NO EXTRA COST

Controlled Environment...

Central Staff Office Building, Ford Motor Company, Dearborn, Michigan. Skidmore, Owings & Merrill, architects, New York; Jaros, Baum & Bolles, mechanical engineers, New York; Bryant & Detwiler Co., general contractor, Detroit.

Make Certain of Its Rewards *with* Johnson Pneumatic Control

Improved worker efficiency, lower employee turnover and easier recruiting tell only part of the story of modern environment control through air conditioning. Usually, there's much more, depending on the type and use of the building.

One of the essentials of successful environment control is an efficient air conditioning control system, such as the Johnson Pneumatic System in the impressive, new Ford Central Staff Office Building. As the role of environment becomes increasingly important, more and more informed planners are equipping their buildings with Johnson Pneumatic Control Systems.

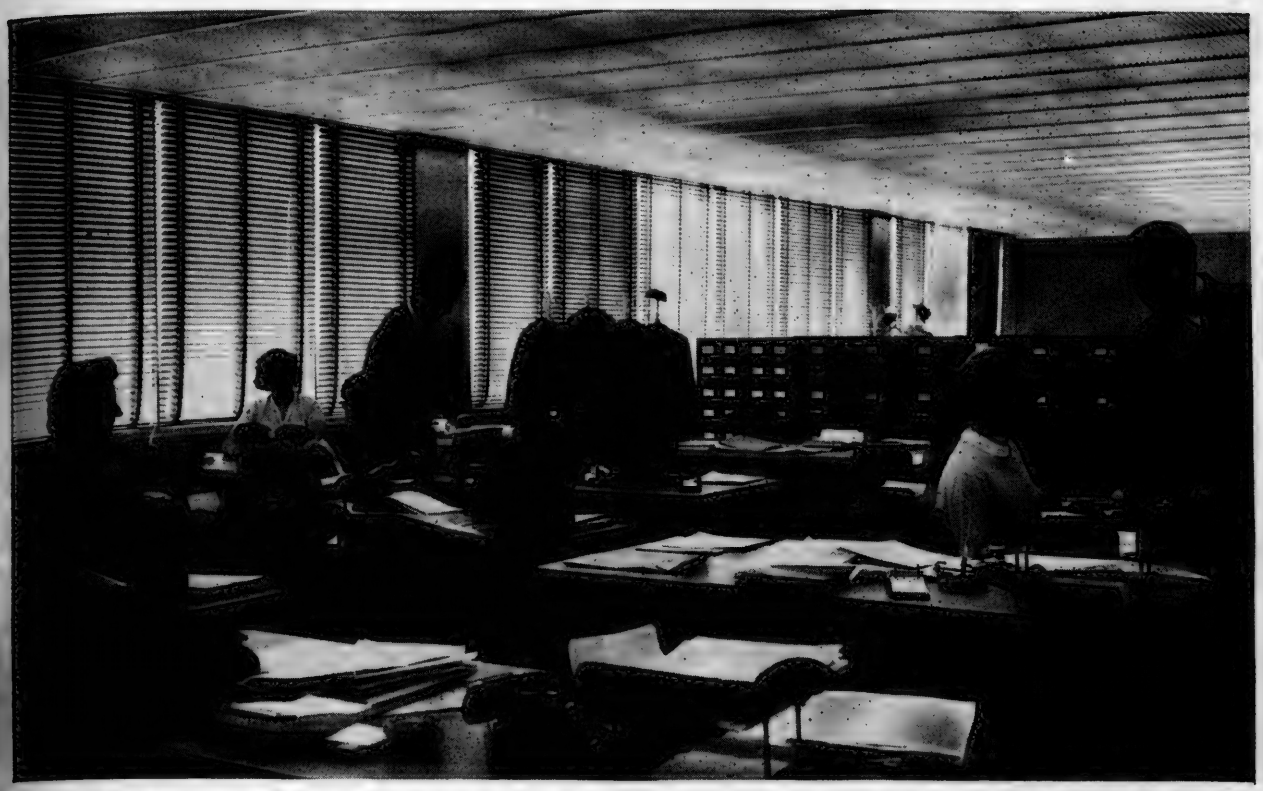
The reasons make sense. Briefly, Johnson Control is capable of meeting *any* control requirement in any type or size building. The choice of operating features is virtually unlimited—whichever features you need to assure the most efficient air conditioning performance are available. And, equally important, *pneumatic control does all this with far fewer components, with less supervision and with greater ease of operation and maintenance than any other type of control.*

Johnson, the leader in pneumatic control, will welcome the opportunity to demonstrate how a pace-setting Johnson System, planned and installed to meet your exact needs, can help you make the most of modern environment control. Johnson Service Company, Milwaukee 1, Wisconsin. 105 Direct Branch Offices.

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

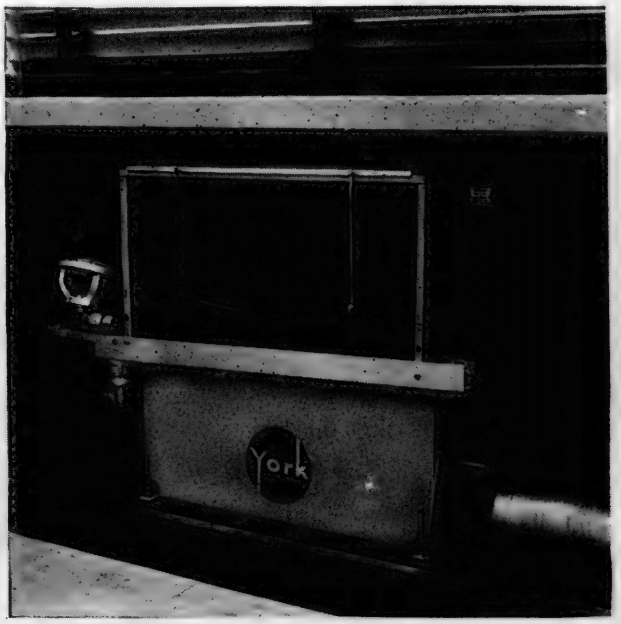


Ford wisely puts the accent on comfort, offers working conditions that rate with the best. A specially designed Johnson Pneumatic Control System directs the operation of 54 central fan air conditioning systems for interior areas and a 3,100-unit induction system serving perimeter offices. Floor area of the building is nearly 950,000 square feet.

Only a Pneumatic System Can Satisfy Modern Control Requirements So Completely and Efficiently, Yet So Simply and Economically

Under-window units offset heat loss or gain from ceiling-high glass wall areas. Controls compensate for variations in outdoor temperatures and exposure in regulating the temperatures of the primary air and water supplied to the room units.

Occupants of each office select their own "weather". Induction units (below) are equipped with Johnson Heating-Cooling Thermostats and Water Valves to apply the final heating or cooling effect to preconditioned primary air.

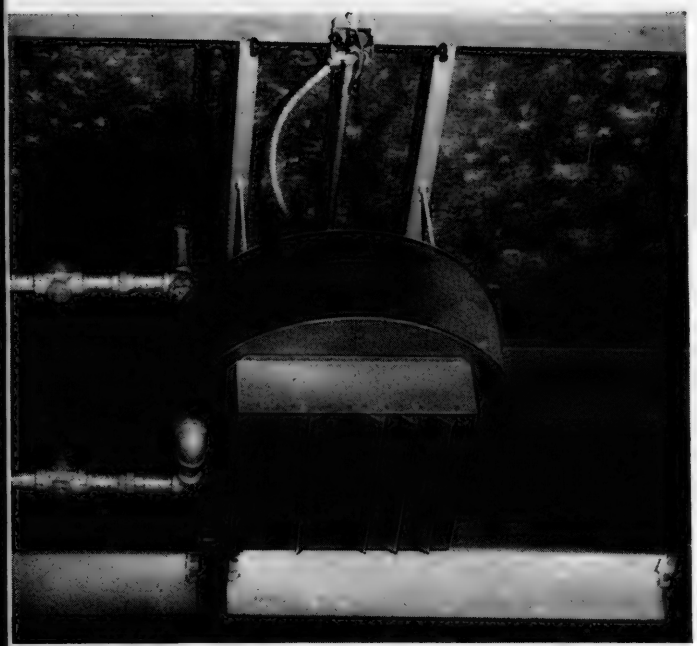


exactly what Solar Aircraft Company

the Herman Nelson **department store** o

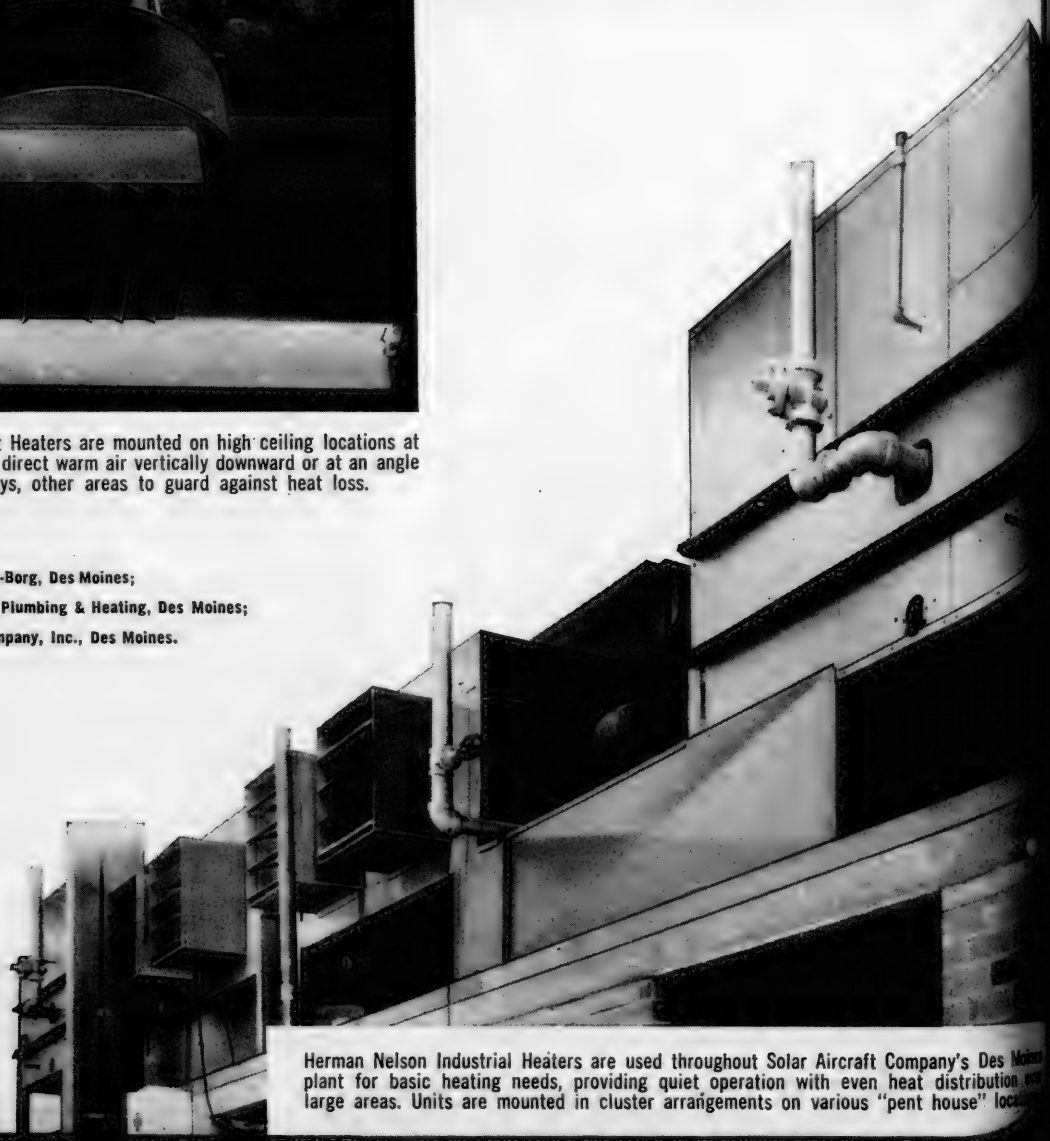
ventilating equipment !

From the vast Herman Nelson line, it was easy for Solar Aircraft Company to choose just the *right* units, in the right capacities, needed to solve all heating problems at its huge Des Moines plant. Solar, with headquarters at San Diego, California, is a major supplier of heat resistant alloys to the aircraft industry. It is typical of the many top-flight manufacturers that look to Herman Nelson for precision performance, guaranteed results in heating and ventilating.



Herman Nelson Vertical Unit Heaters are mounted on high ceiling locations at Solar's Des Moines Plant to direct warm air vertically downward or at an angle near loading docks, doorways, other areas to guard against heat loss.

Architects & Engineers—Brooks-Borg, Des Moines;
Mech. Contractor—M. A. Wolin Plumbing & Heating, Des Moines;
Gen. Contractor—The Weitz Company, Inc., Des Moines.



Herman Nelson Industrial Heaters are used throughout Solar Aircraft Company's Des Moines plant for basic heating needs, providing quiet operation with even heat distribution over large areas. Units are mounted in cluster arrangements on various "pent house" locations

any needed from

heating and

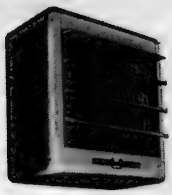
AAF herman nelson

American Air Filter

Company, Inc.

294 Central Avenue, Louisville 8, Kentucky

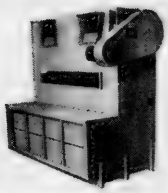
BETTER AIR IS OUR BUSINESS



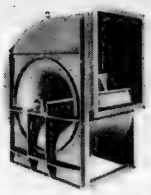
Horizontal Unit Heater Available in 18 sizes, designed for ceiling suspension and also to use either steam or hot water. Quiet operation; compact design. Catalog No. 700.

Roll-O-Vent Air handling units that change their own filters automatically. Media loads like a camera, lasts up to a year. Catalog No. 780A.

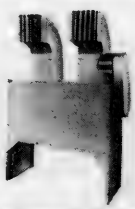
Vertical Unit Heater For high ceiling installations. Discharges air vertically downward or at angle to vertical in various directions. Steam or hot water. Catalog No. 700.



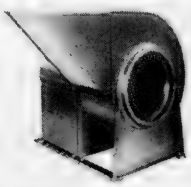
Air Conditioning Unit New type air-conditioning units for low cost commercial and industrial applications. Delivers up to 15,000 cu. ft. clean, cooled air per min. Catalog No. 785.



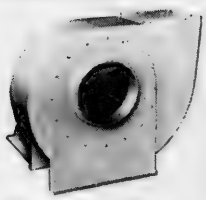
Centrifugal Fan Available in either slow speed or non-overloading types; 17 wheel diameters from 12¼" to 73"; 8 arrangements for direct or belt drive. Catalog No. 850.



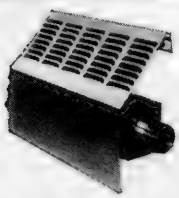
Industrial Heater Replaces exhausted air, balances minus pressures. Big capacity — does the job of many smaller, propeller-type units. Catalog No. 750.



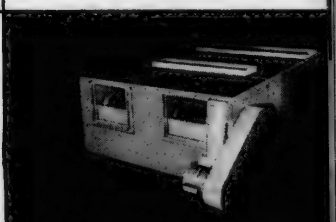
Unit Blower Years-ahead features in new "packaged" Unit Blowers. Compact, spacesaving, easy to service. Wide range of unit sizes. Catalog No. 826.



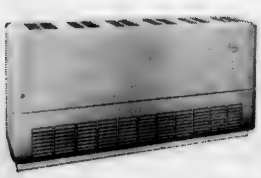
Industrial Exhauster Exclusive hub assembly cuts maintenance & replacement costs. New impeller design; heavy duty shaft & bearings. Catalog No. 860.



Finned Radiation Available steel fins on steel tubing or aluminum fins on copper tubing. Light-weight, suitable for exposed or concealed installation. Catalog No. 790.



Heating & Ventilating Unit. Hangs on wall or floor. Quiet operation slow speed with completely rotable fan sections. Catalog No. 775.



Console Heater 16 models — 64 air inlet-outlet arrangements. Fully-recessed, semi-recessed or free-standing applications. Smartly designed. Catalog No. 727.

Propeller Fan Operates horizontally or vertically; belt or direct drive. Wide range of sizes in both types. Capacities to 36,150 CFM. Low operating cost. Catalog No. 800.

SO HALSTEAD & MITCHELL ENGINEERS ASKED . . .

WHICH TURBU-FLO COIL MEETS YOUR REQUIREMENTS?

Halstead & Mitchell coils with Turbu-Flo fins are designed for rugged and long service life. And Turbu-Flo provides up to 15% more heat transfer capacity.

STEAM COILS are available in both standard and non-freeze types. WATER COILS are for use with chilled or hot water. DIRECT EXPANSION COILS are equipped with a pressure type distributor and circuited for minimum refrigerant pressure drop . . . will accommodate any make expansion valve, refrigerants 12 or 22. All coils are regularly available in from 1 to 8 rows deep, in finned heights of 12 to 36 inches, and in lengths up to 10 feet. Manifolding can be arranged for left, right or opposite-hand connections. Other sizes or special coil types can be provided to meet your specifications.

EXCLUSIVE, EFFICIENT TURBU-FLO

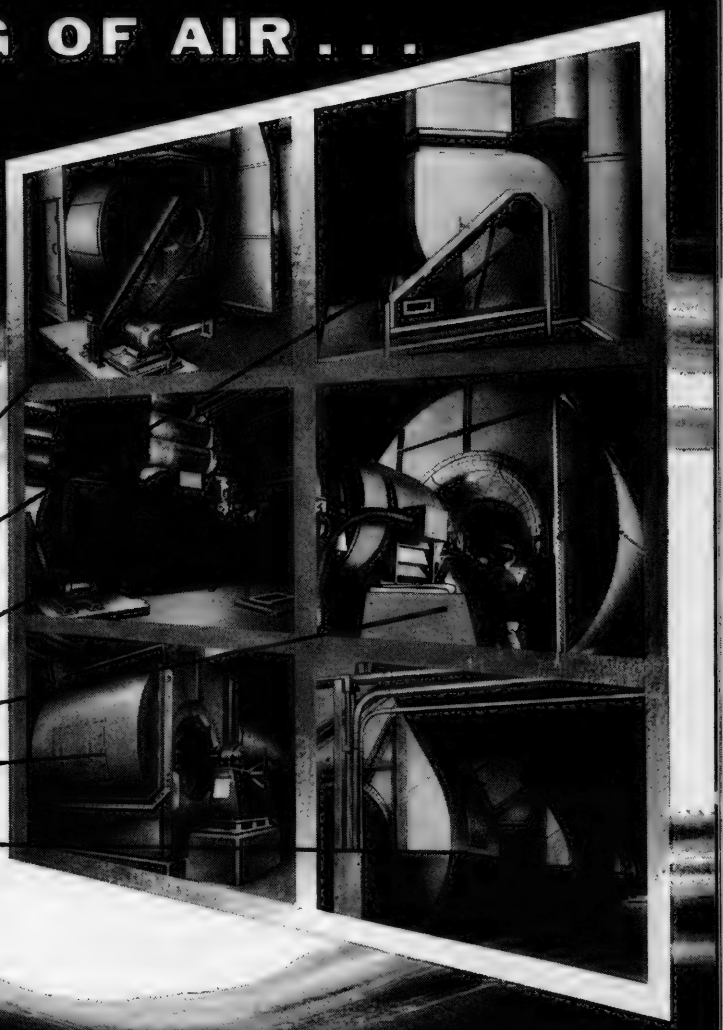
All coils feature the exclusive Turbu-Flo fins. Streamline design creates better air wash, lowering air film resistance and improving heat transfer; yet friction is at a minimum. Turbu-Flo fins are made of aluminum (available in copper), mechanically bonded to seamless copper tubing.

Casings are of heavy gauge steel fully protected against corrosion or of heavy gauge aluminum. Surrounding flanges simplify ductwork installation.

Write for more specific information, delivery and prices. *Halstead & Mitchell, Bessemer Building, Pittsburgh 22, Pa.*

HM
Halstead & Mitchell

NOW! A NEW STANDARD FOR THE HANDLING OF AIR . . .



FOR

1. Building Ventilation
2. General Supply and Exhaust
3. Conventional and High Pressure Air Conditioning
4. Vehicular Tunnel Ventilation
5. Industrial Processing
6. Combustion Air Supply

Series 8000

NEW AIRFOIL CENTRIFUGAL FANS!

. . . the new standard in a complete line

FULL RANGE APPLICATION

GENERAL PURPOSE

Classes I and II

Up to 6¾" Total Pressure

HEAVY DUTY

Classes III and IV

Up to 16¾" Total Pressure

Up to 700,000 CFM

Westinghouse Airfoil Blading has proved its effectiveness in six years of operation by two hundred customers in Mechanical Draft, Industrial Process, and High Pressure Air Conditioning.

Westinghouse now obsoletes conventional flat blading and brings you the efficiency and quietness of Airfoil Blading for ALL PURPOSE applications in a complete standard line of Centrifugal Fans, covering every requirement up to 700,000 CFM . . . Up to 16¾" total pressure.

J-80640

WESTINGHOUSE AIRFOIL CENTRIFUGAL FANS NOW GIVE YOU . .

- ★ **LOWEST OPERATING COSTS . . .** High Efficiency — Low Horsepower!
- ★ **QUIET OPERATION . . .** Airfoil Blading — Streamlined Air Flow!
- ★ **CAPACITY PROTECTION . . .** Steep Pressure Curve — Minimum Capacity Variation!
- ★ **NON-OVERLOADING POWER FEATURE!** Full Load at Motor Rating—No Overload!
- ★ **AMCA (NAFM) STANDARD SIZES!**

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE . . . IF IT'S Westinghouse

Owners: Boston Manufacturers Mutual Insurance Company and Mutual Boiler and Machinery Insurance Company Waltham, Massachusetts

Architects: Anderson, Beckwith & Haible.

Mechanical Engineer: Delbrook Ventilating Co.

Mechanical Contractor: C. H. Cronin Co., all of Boston, Mass.

Air view shows central court.

Above: Reception Lobby.

Above: Cafeteria and Lounge.

Right: Court, Penthouse and Lounge.

Award Winning Office Building also won Thermal Comfort with

POWERS Quality System of

AIR CONDITIONING CONTROL

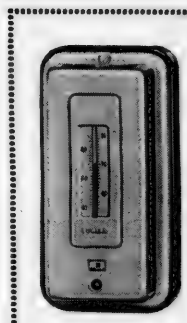
This Winner of Significant Architectural Awards is one of the nation's outstanding suburban office buildings. It was a 1957 recipient of the highest building design award of the American Institute of Architects. It also received the Boston Arts Festival Architecture Award and the 1957 Parker Medal for "the most beautiful building in Metropolitan Boston". In addition to "achieving such splendid use of its site and such useful splendor in its central court the building provides an attractive, pleasing environment, comfortable and highly efficient to work in."

Big Dividends from ideal year 'round comfort are assured here by Powers accurate control of temperature and humidity. It helps workers accomplish more with fewer costly errors, reduces absenteeism, helps hold good workers and attract desirable new employees.

Nine multizone air conditioning units provide heating, ventilating and air conditioning for the office areas. IBM room and cafeteria are served by a special unit. All are Powers controlled including the 250 ton refrigeration compressor which provides chilled water for the air conditioning units. See photo below.

Direct radiation, to offset wall losses during the heating cycle, is divided into 7 zones, each served with compensated hot water. FLOWRITE 3-way valves, controlled by Powers instruments mounted on central panel boards, regulate the temperature of hot water for each zone.

Are You Planning A New Building or modernizing an old one? If so, ask your architect or engineer to include a Powers Quality system of temperature and humidity control. They have been time-proven dependable and economical in thousands of prominent buildings since 1891.



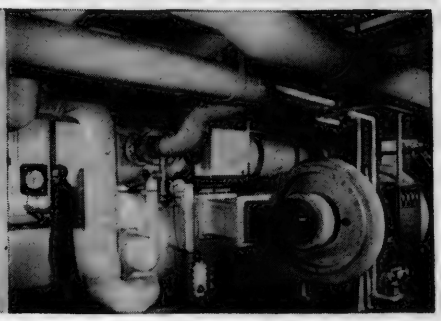
Symbol of Economy and Quality Control

Once set, a Powers pneumatic thermostat, holds temperature constant day after day. It needs no frequent checking or readjustment.

Powers FLOWRITE 3-way Control Valve.

Left: One of two central panels with Powers Series 100 Temperature Indicating Sub-Master Controllers. Pneumatic selector switches provide manual operation when required.

Right: Chilled water supply for air conditioning units is regulated by a Powers Temperature Recording Controller.



For further information contact our nearest office

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in Chief Cities in U.S.A., Canada and Mexico*

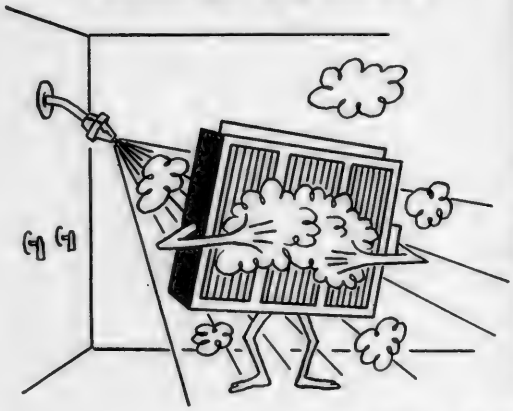
65 YEARS OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

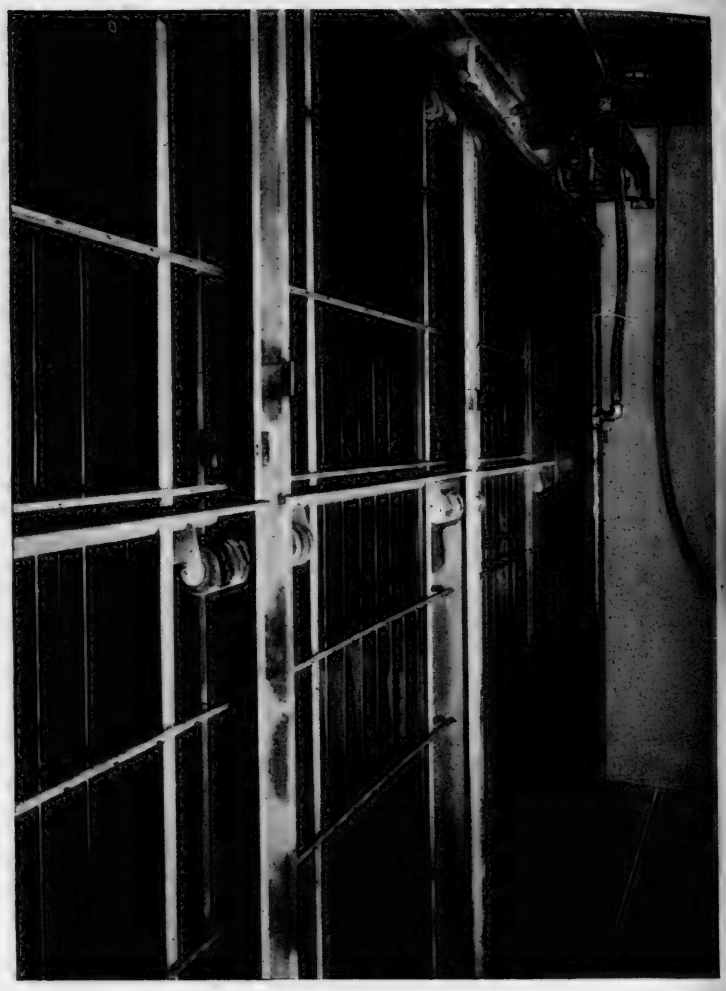
(c65)

Electro-CELL PRECIPITATOR

HAS ITS OWN

PRIVATE SHOWER





Type H Washer Makes AAF Filter "Come Clean" at the Push of a Button

A man to press one button periodically! That's all it takes to keep an AAF Electro-Cell with Type H Washer as "clean as a whistle". This means super-clean air around the clock, with no maintenance worries.

This electrostatic precipitator has its own private shower consisting of a set of traveling spray nozzles. At a press of the button, they move back and forth across the collector plates. Spray heads are automatically adjusted to point at a 5-degree angle in the direction they are traveling, insuring that each side of each individual plate is washed thoroughly.

This high efficiency precipitator collects dust, soot and smoke as a routine assignment, maintains this efficiency at minimum cost and effort. Ask your local AAF representative for all the facts on Electro-Cell with Type H Washer, or write direct for Bulletin 252-E3A.

AAF American Air Filter COMPANY, INC.
294 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

AAF Filters and Precipitators

AAF Dust Control Equipment

BETTER AIR IS OUR BUSINESS

Herman Nelson Unit Heaters

Illinois Steam Heating Specialties

An Important Announcement

TO ASSURE YOU THAT AIR MOVING EQUIPMENT...

...will perform according to its published ratings

An international program is under way by AMCA. It will provide you as rapidly as possible with a means of identifying those types of air moving equipment qualifying under the program.

As a protection to you, practically all leading manufacturers of air moving equipment are planning to qualify their standard products in tests made in accordance with the AMCA Standard Test Code and in laboratories inspected and approved by AMCA.

Each qualifying company will operate under a license agreement with AMCA basically requiring the following:

1. **The manufacturer's laboratory must be approved by AMCA.**
2. **Qualifying equipment must be tested in accordance with the AMCA Standard Test Code and published ratings must be in accordance with such tests.**
3. **The manufacturer must maintain manufacturing control of the products involved so that the equipment will perform in accordance with published ratings.**

For more details fill in and mail the coupon below.

AIR MOVING & CONDITIONING ASSOCIATION, INC.

CUT OUT AND MAIL

AIR MOVING & CONDITIONING ASSOCIATION, INC.
2159 Guardian Bldg.
Detroit 26, Mich.

Please let me have details on the AMCA Program for rating of air moving equipment.

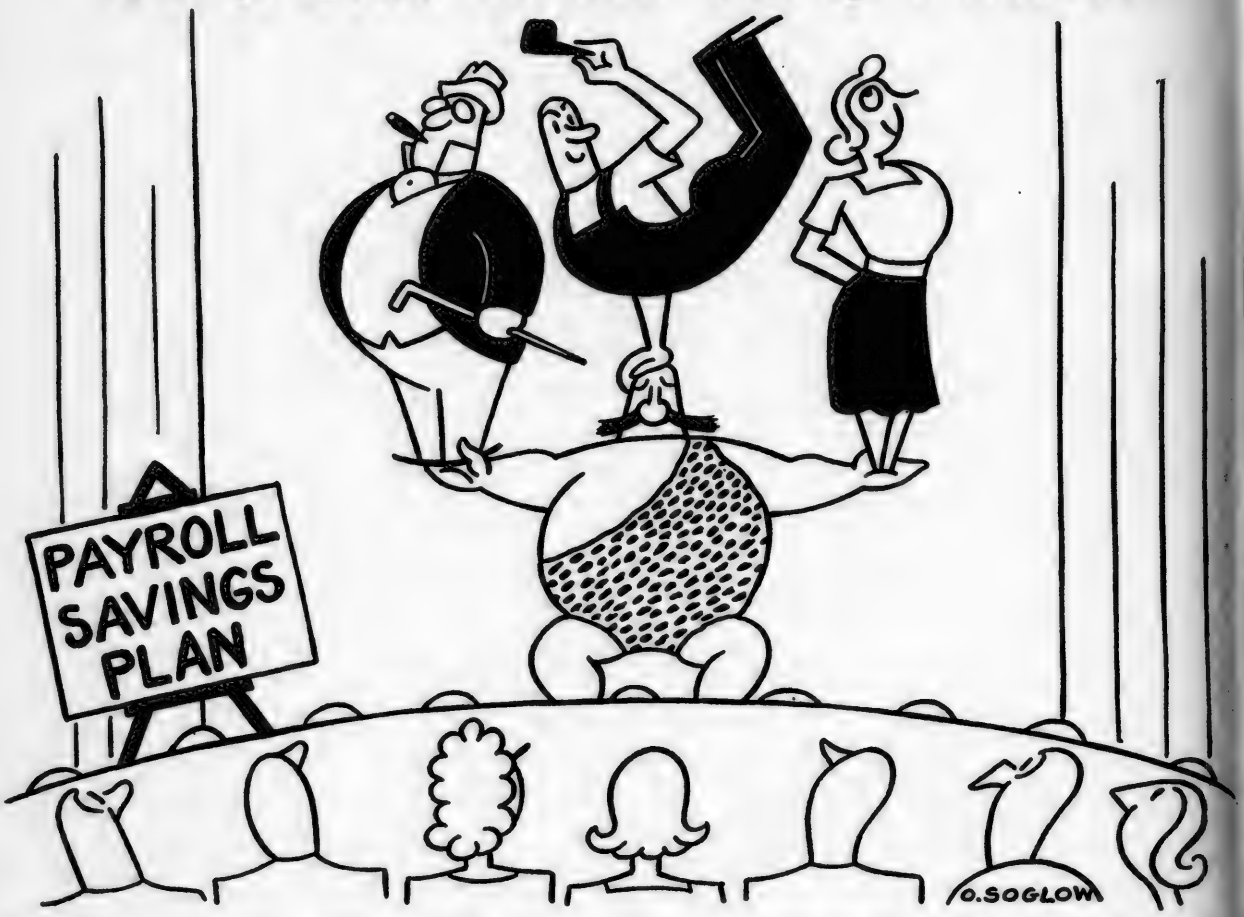
NAME_____

COMPANY_____

ADDRESS_____

CITY & STATE_____

"Got A Load On Your Mind? I Haven't"



Nothing gives employees a more luxurious, satisfied feeling than that of financial security. And nothing is easier for them to achieve when you provide the convenience of automatic Payroll Savings Plan.

EVERYBODY BENEFITS

Security breeds confidence—and confidence stimulates job interest and results in steadier people who are far more efficient in their work. Receiving those crisp Bonds at regular intervals along with their paycheck is an added inducement for employees to stay on the job.

Moreover, when you install the Payroll Savings Plan in your company, you promote not only the security of your personnel but the security of your company and your country. Over forty million Americans have over 40 billion dollars invested in United States Savings Bonds—a backlog of purchasing power for the future.

EASY TO INSTALL

If your company does not now have a Payroll Savings Plan, or if employee participation is less than 50%, a letter to: Savings Bonds Division, U. S. Treasury Department, Washington, D. C. will bring prompt assistance from your State Director. He will provide application cards, promotional material, and as much personal help as you need.

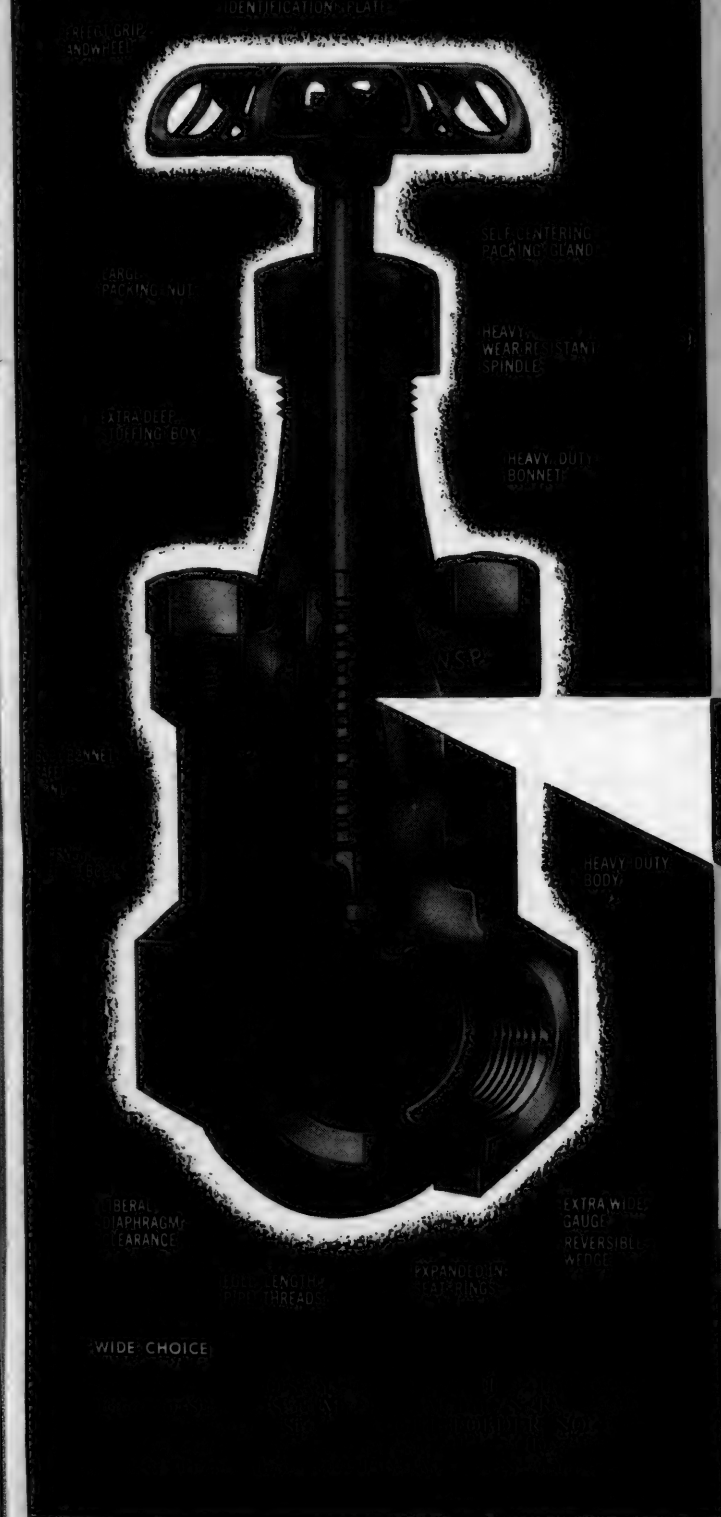
The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

AIR CONDITIONING, HEATING & VENTILATING

Only the big line of

JENKINS U-BOLT GATES

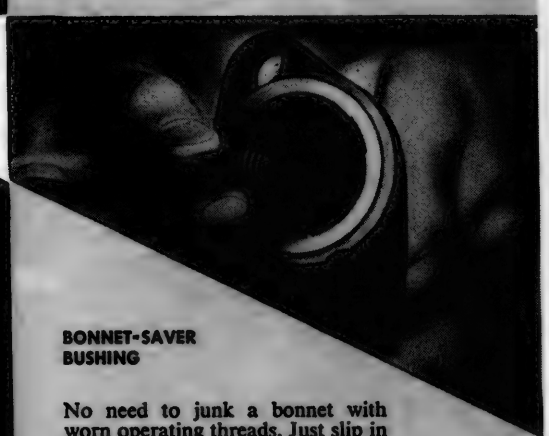
has all these dollar-saving features



Priced no higher

DESIGNED TO COST LESS TO USE

Built right into a Jenkins U-Bolt Gate Valve are dollar-saving features no other can match. Construction superiorities that equip this valve to take punishment longer . . . saving dollars in replacement bills. Features that cut maintenance time and the cost of replacement parts . . . saving more dollars. For a good example, look at the unique Renewable Bonnet Saver Bushing which is a patented feature of Inside Screw valves.



BONNET-SAVER BUSHING

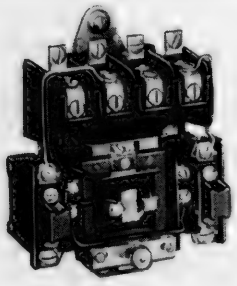
No need to junk a bonnet with worn operating threads. Just slip in a new bushing for good-as-new thread engagement . . . saving bonnet and lengthening spindle life.

JENKINS VALVES

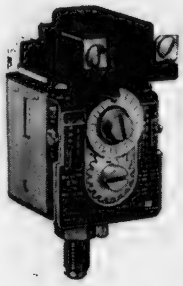
LOOK FOR THE JENKINS DIAMOND

JENKINS

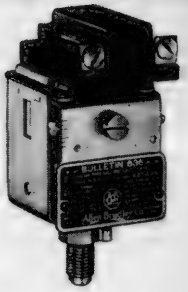
Sold Through Leading Distributors Everywhere



Bulletin 709 solenoid starter, with double break, silver alloy contacts, has only ONE moving part . . . no pins or bearings to corrode and stick. Reliable overload relays.

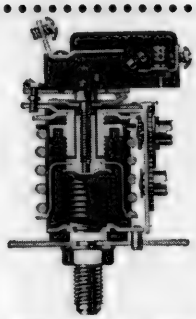


Bulletin 836 pressure switch for steam, air, water, and non-corrosive liquids and vapors, has range from 30 in. of vacuum to 700 psi. Built to industrial control standards.

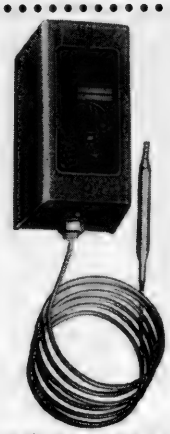


Adjustable high pressure cutout with range and differential adjustments. Snap action precision switch assures opening and closing of pilot circuit —instantly—without hesitation.

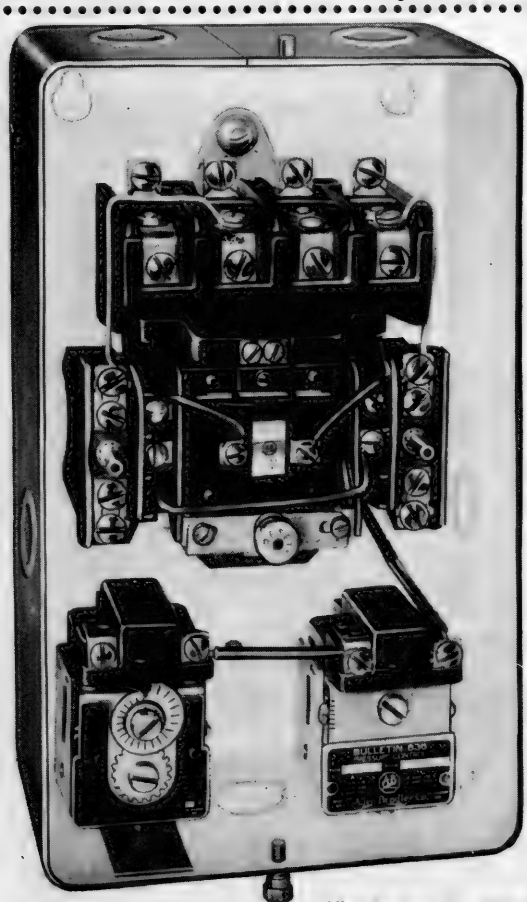
Low pressure cutout is available in 4 ratings: Type 1 has pilot duty rating; Type 2 has intermediate hp rating; Type 3 has a higher hp rating; Type 4 is for d-c operation.



Gas, vapor, or liquid pressure expands the metal bellows against an adjustable spring. The same operating principle applies to both temperature and the pressure controls.



Bulletin 837 temperature control has a bulb containing a volatile liquid whose pressure increases with temperature. The pressure is transmitted to the bellows to open or close the contacts at the predetermined temperature setting.



ALLEN-BRADLEY CONTROLS

are *trouble free*—your assurance of dependable service

At the left is a factory assembled and factory tested special air-conditioning control panel, equipped with high and low pressure cutouts and a Bulletin 709 solenoid starter, providing reliable motor overload protection.

At present labor rates, the cost of a field assembled installation is not low . . . and you have no factory test protection against loose connections, carelessness, etc.

Better let us quote you on the completely assembled panel. Everything considered, it is a low cost investment in a reliable control system for a refrigeration or air-conditioning installation.

Full information is contained in the new 7th edition of the Allen-Bradley Handy Catalog. Please send for a copy.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

Allen-Bradley Co., 1330 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

High-Rise Building . . .
High-Velocity System . . .
High-Quality ULTRALITE DUCT INSULATION

ULTRALITE, the long glass fiber duct insulation, is the logical choice for high-velocity air conditioning systems where cost and performance are prime considerations. There's a big saving in heat loss (or heat gain) due to ULTRALITE'S superior thermal efficiency. There's a big saving in application cost, too, because blanket rolls of ULTRALITE, with vapor barrier adhered, wrap quickly around ducts of every size and shape . . . and because ULTRALITE'S long-fiber strength makes it easy to secure in place by methods not practical with ordinary glass fiber blankets. It does not tear or lose thickness, and you get a nice looking job without "thin spots", for ULTRALITE always springs back to its original thickness. From every standpoint, ULTRALITE is the *best* duct insulation—yet it costs no more!

FOR COMPLETE INFORMATION ABOUT ULTRALITE DUCT INSULATION AND DUCT LINER, WRITE TODAY FOR SAMPLES AND A.I.A. BULLETINS.

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Thermal and acoustical glass fiber insulations • Pipe couplings and fittings
Molded glass fiber pipe insulation

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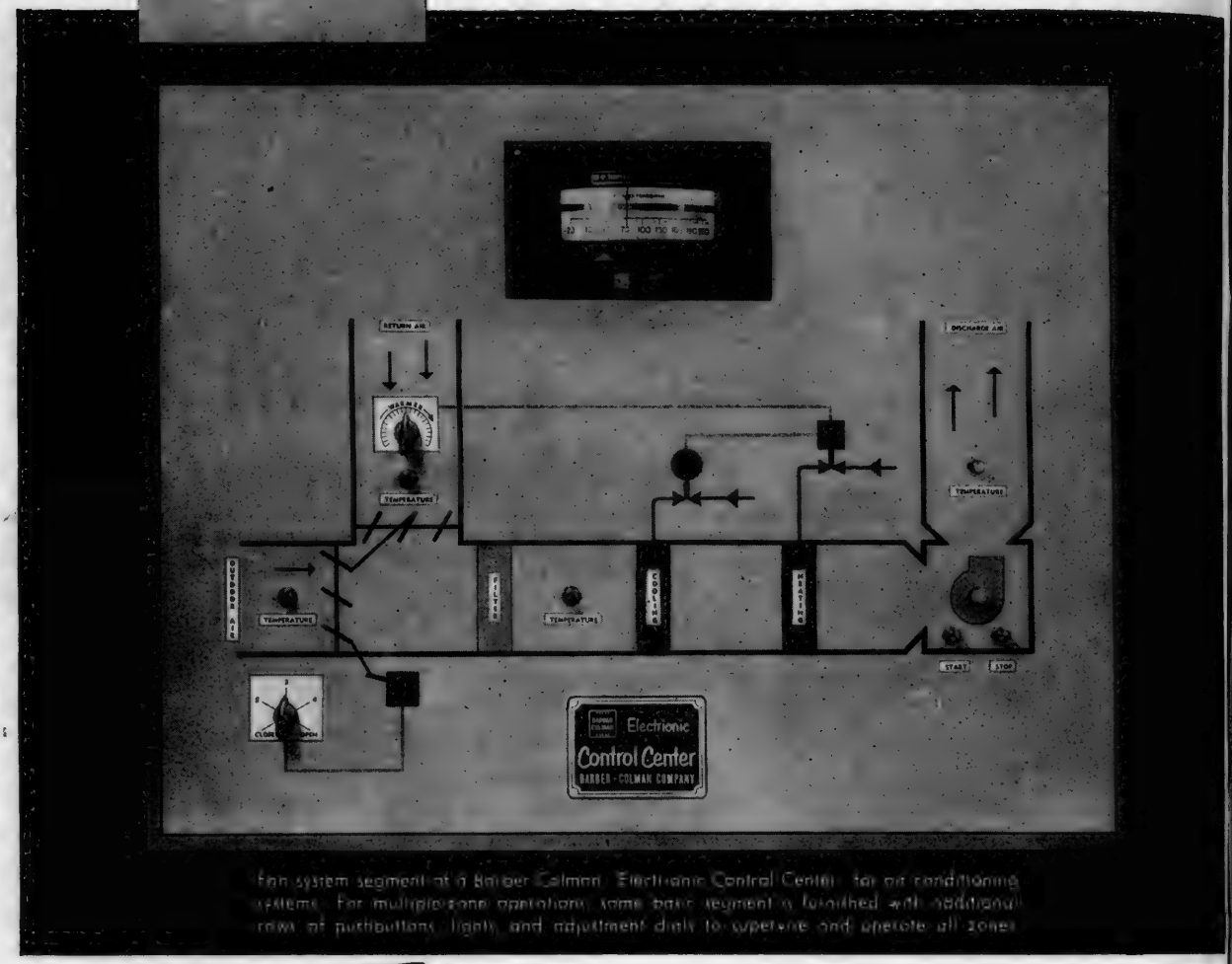
THE MARK OF QUALITY

BARBER COLMAN

heart of an

Electronic Control Center

with Remote Temperature Indication
Remote Temperature Adjustment
Schematic Illustration



Fan system segment of a Barber-Colman Electronic Control Center for air conditioning systems. For multiple-zone operations, some panel segment is furnished with additional rows of pushbuttons, lights, and adjustment dials to supervise and operate all zones.

The Barber-Colman "Electronic Control Center" is a "unified source of control," years ahead in design, to meet the precision control needs of modern buildings. Developed by recognized specialists in the temperature control field, it has the built-in flexibility of "electronics" to automatically control and synchronize the many functions of a building's mechanical and electrical systems. Brings you *substantial* savings on installation and operating costs... and adds such desirable features as: *Remote Temperature Indication... Remote Temperature Adjustment... Schematic Illustration* for visual supervision of the entire building... *Records of Performance*... plus various other control functions you might require. For complete story, see nearest Barber-Colman Company Field Office... or write for new free illustrated booklet, "Electronic Control Centers."

BARBER-COLMAN COMPANY

Dept. W, 1302 Rock Street, Rockford, Illinois, U.S.A.

Automatic Controls • Air Distribution Products • Small Motors • Industrial Instruments • Aircraft Controls • Electrical Components • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

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MAY BE THE ANSWER!

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INTERNATIONAL AMPHITHEATRE — CHICAGO — NOV. 18-21

PACKAGED AIR COOLED UNITS UP TO 7½ TONS

PACKAGED LIQUID CHILLERS UP TO 100 TONS

PACKAGED UNITS 25 THRU 50 TONS INTEGRAL EVAPORATIVE CONDENSER OPTIONAL

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OUR 103rd YEAR

MANUFACTURING COMPANY

REFRIGERATION DIVISION

1999 Kienlen Ave. St. Louis 20, Mo.

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INDUSTRIAL AIR COMPRESSOR

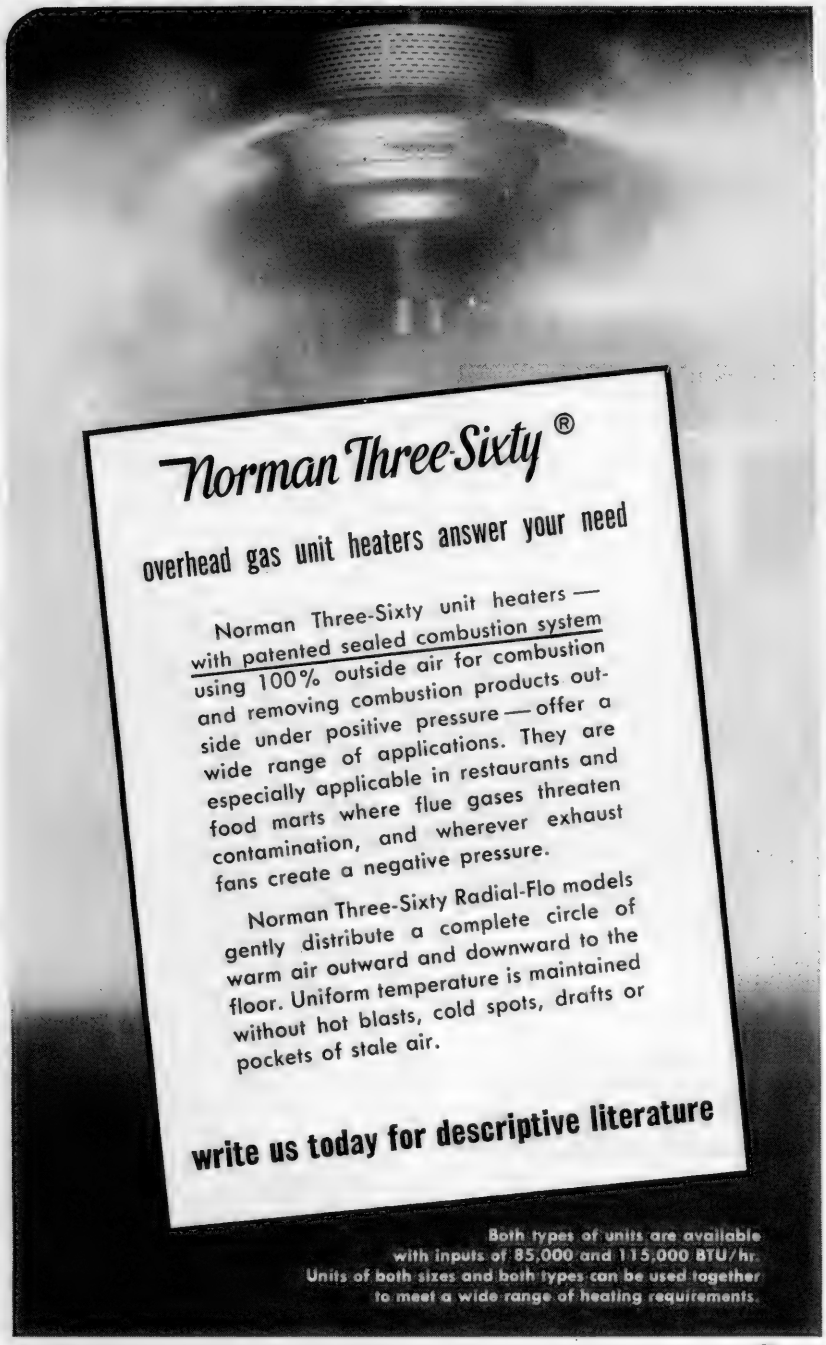
AIR HOISTS AIR CYLINDERS

AUTO LIFTS

AN UMBRELLA OF COMFORT . . . OR SPOT HEATING

Norman Three-Sixty®

WITH SEALED COMBUSTION



Norman Three-Sixty®

overhead gas unit heaters answer your need

Norman Three-Sixty unit heaters — with patented sealed combustion system using 100% outside air for combustion and removing combustion products outside under positive pressure — offer a wide range of applications. They are especially applicable in restaurants and food marts where flue gases threaten contamination, and wherever exhaust fans create a negative pressure.

Norman Three-Sixty Radial-Flo models gently distribute a complete circle of warm air outward and downward to the floor. Uniform temperature is maintained without hot blasts, cold spots, drafts or pockets of stale air.

write us today for descriptive literature

Both types of units are available with inputs of 85,000 and 115,000 BTU/hr. Units of both sizes and both types can be used together to meet a wide range of heating requirements.

For high ceiling and doorway applications, the Norman Three-Sixty Down-Blo units blast heat directly downward through the bottom of the unit. Before striking the floor, the heat spreads to cover a wide area with gentle warmth.

Norman® products company • 1166 chesapeake ave. columbus 12, ohio

IN CANADA: A. D. PALMER & CO., Lethbridge, Alberta • Port Credit, Ontario

you get MORE and MORE to choose from with

McQuay Seasonmaster central station air conditioners give you more of everything you want, more of everything you need. There is more inherent quality—more dependability—more rugged construction—more flexibility in location of coil connections and air openings—so necessary to that kind of satisfaction that only McQuay Seasonmaster provides. McQuay also gives you more to choose from, with 16 models in either horizontal or vertical type. Add to this the most complete combinations of heating and cooling coils—water, steam or direct expansion—all with the famous McQuay Ripple-Fin construction, and the wide range of accessories, and you have the most universal line of central station air conditioners in the industry. Yes, you really get more—and more to choose from with McQuay Seasonmaster central station air conditioners. For complete information, contact the McQuay representative in or near your city or write McQuay, Inc., 1619 Broadway St. N. E., Minneapolis 13, Minn.

McQuay

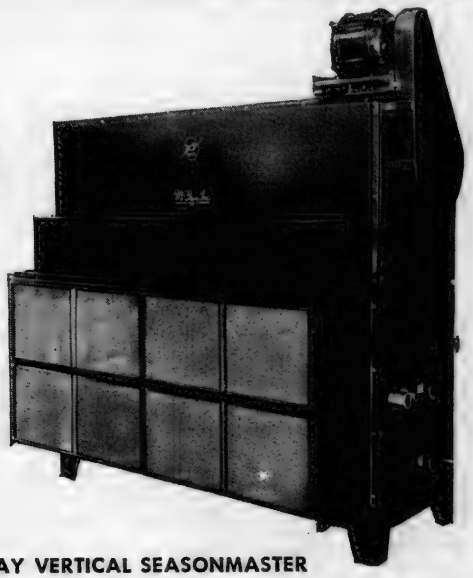
SEASONMASTER

central station air conditioners

TV Means Quality

McQUAY HORIZONTAL SEASONMASTER

McQuay horizontal Seasonmaster, shown above, with water coil, steam coil and "V" filter section. Removable panels permit complete accessibility for inspection or service. All Seasonmaster coils are made with the exclusive McQuay Ripple-Fin construction.



McQUAY VERTICAL SEASONMASTER

McQuay vertical Seasonmaster, shown above, with direct expansion coil, steam coil, face and by-pass, and flat filter section. Heavy gage galvanized channel framework to form a rigid structure. Sixteen sizes available in either horizontal or vertical type. C.F.M. range from 640 to 29,000.

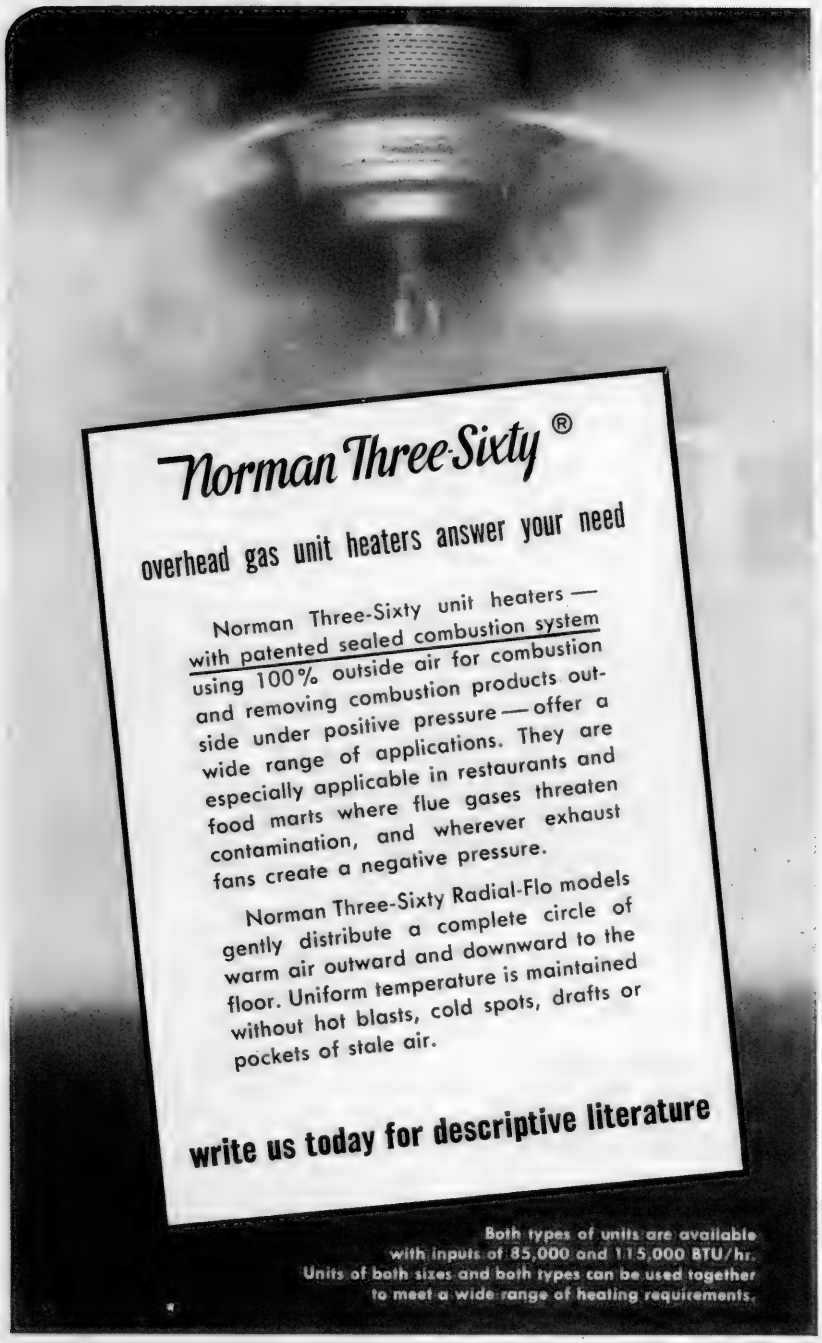
McQuay INC.

AIR CONDITIONING
HEATING
REFRIGERATION

AN UMBRELLA OF COMFORT . . . OR SPOT HEATING

Norman Three-Sixty®

WITH SEALED COMBUSTION



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IN CANADA: A. D. PALMER & CO., Lethbridge, Alberta • Port Credit, Ontario

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McQuay INC.

AIR CONDITIONING
HEATING
REFRIGERATION

How high velocity provides maximum comfort for schools

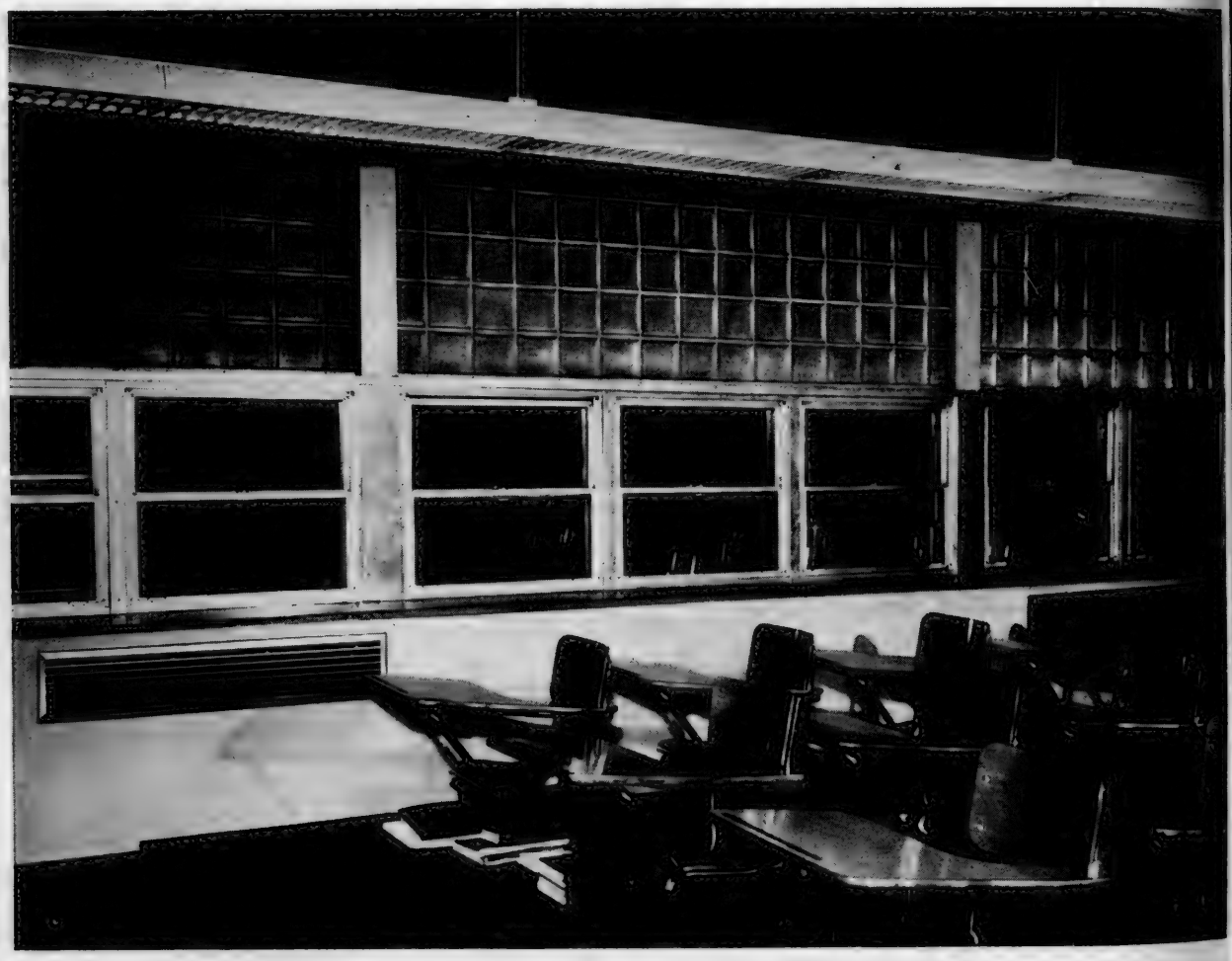
The *Anemostat All-Air High Velocity* system of draftless air distribution offers many important advantages for heating and ventilating schools. • High velocity units, used with smaller than conventional ducts, save space and money. They substantially reduce sheet metal required, can be installed faster, at less cost. Since there are no coils in All-Air HV units, clogging and odors are eliminated. • Anemostat *All-Air HV* operate entirely with air processed in the main equipment room; there is, therefore, no need to break through the walls of the building for prime air make-up. The Anemostat *All-Air HV* units eliminate fans, filters, and electric motors in the school rooms. Units are quiet, need a minimum of maintenance from custodians. • On these pages are typical installations in which the *Anemostat All-Air High Velocity* system has been used successfully. Application data on your specific school heating, ventilating or air conditioning problem is available from Anemostat representatives or from the home office.

Write on your business letterhead for your copy of

New Anemostat® Selection Manual 60

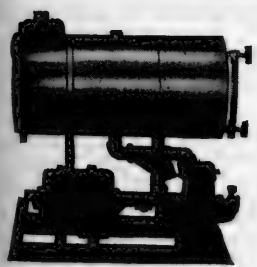
to Anemostat Corporation of America, 10 East 39th Street, New York 16, N.Y.

AC 1256



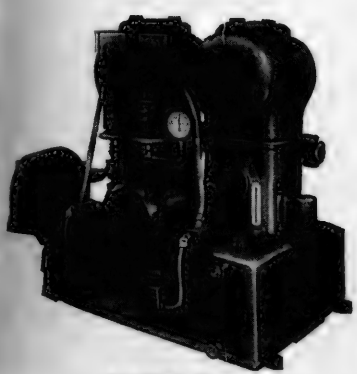
Skidmore

TYPE "HS"
ONDENSATION PUMP



"TM" TURBINE

"UV" TYPE



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It's the Nash CSM

Designed and manufactured by the organization that made the Jennings Manifold Heating Pump standard of the Heating Industry, the new CSM incorporates every desirable feature architects, engineers, owners and operators have sought. Employing separate air and water pump elements, each with its own motor and each independently controlled by its own automatic switch, the capacities and arrangement may be widely varied to meet job conditions. For the first time, the engineer has the choice of realistic water and air capacities required for rapid system response without wasteful overheating.

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- Increased air capacity induces rapid system response without wasteful overheating.
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- Control system that operates individual pumps only when needed.
- Flexibility permitting addition of radiation without changing basic pump installation.
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Cooling Tower for Shopping Center Served by Stored Run-off Water

FRED H. KLUCKHUHN
Member of Kluckhuhn, Cobb & McDavid Co.
Consulting Engineers, Washington, D. C.

An unusual application is described whereby the run-off water from a large shopping center is collected in a retention basin under a building. This stored water has been made part of a cooling tower system to condense refrigerant vapor in a 3000-ton air conditioning system. With the exception of one manually operated valve, system is automatic.

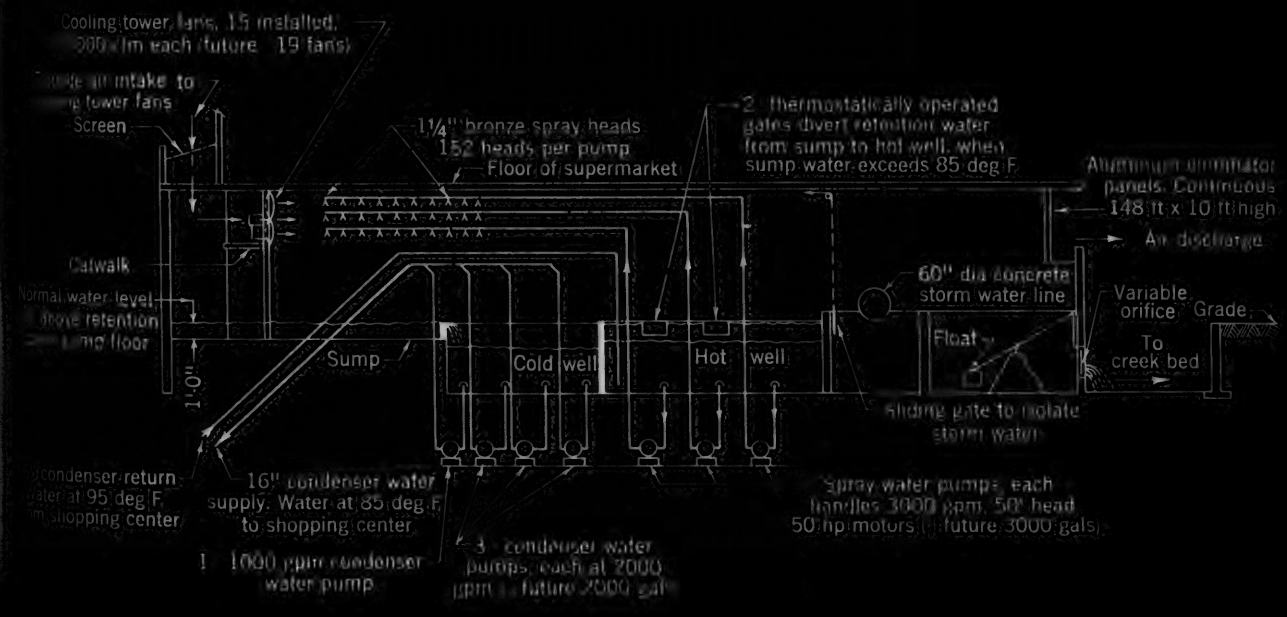
HANDLING run-off water from large, hard-surfaced areas, has always been an engineering problem. However, in the design of the Seven Corners Shopping Center located on a 30-acre tract, the run-off water is retained in an underground basin to serve the cooling tower which is part of a 3000-ton air conditioning system. The designers believe that this is the first time that run-off water is made to serve in such a manner for an air conditioning system.

The shopping center is located in Fairfax County, Va., eight miles from Washington, D. C. It contains about 40 stores—the largest a department store served by 450 tons of refrigeration, and the smallest a candy store served by 3 tons refrigeration. When the proposed upper floors are installed, the total air conditioning will be approximately 3000 tons.

To understand some of the design problems, first consider the site. The property slopes from a high elevation of 400 ft on the south side of the site to a low elevation of 320 ft on the east side, adjacent to another shopping center. A small brook drains an additional area of approximately 50 acres, and courses across the north boundary to discharge on the east side at the low point of the property. Approximately one-third of the total drainage area of this particular stream is covered by the shopping center. There were no facilities for the disposition of storm water from this area other than the previously-mentioned brook which passes through numerous residential areas on its way to the Potomac River.

This stream had been a constant source of trouble and complaint as a result of frequent flooding each time a severe storm occurred. A survey of the area made prior to the start of the design work indicated that a number of homes had been built at the edge of the water course of the stream. Retaining and barrier walls had been erected to try to divert the flow of the water from the

Flow diagram of spray, condenser and storm water system for shopping center.


Screen
1¼" bronze spray heads
152 heads per pump
Floor of supermarket
2 thermostatically operated gates divert retention water from sump to hot well, when sump water exceeds 85 deg F
Catwalk
Normal water level above retention pump floor
Sump
Cold well
Hot well
60" dia concrete storm water line
Float
Variable orifice
Grade
To creek bed
Sliding gate to isolate storm water
16" condenser water supply. Water at 85 deg F to shopping center
1 1000 gpm condenser water pump
3 condenser water pumps, each at 2000 gpm
Spray water pumps, each handles 3000 gpm, 50' head
50 hp motors

Fred H. Kluckhuhn, member of the consulting engineering firm of Kluckhuhn, Cobb & McDavid Co., Washington, D. C., received a B.S. in Mechanical Engineering degree from the University of Maryland in 1938. He served as mechanical design engineer with the Navy Department, and as mechanical design engineer with the Veterans Administration, Washington, D. C., for hospitals and related projects. In 1947 he was an associate member of a large consulting engineering firm and in 1950 he opened his own office. This has grown into the present engineering company. During World War II he served for three years with the Air Force as an engineering officer and as a rated pilot.

houses. It was obvious that any increase in the discharge rate of storm water from the site could not be tolerated.

Our studies showed that the rate of run-off prior to the start of construction operations was approximately 25% of the water falling upon the surface. We utilized a 100% run-off factor for the impervious paved areas which, of course, resulted in an increased run-off of four times the original previous run-off rate.

Retention Basin

These studies revealed that it would be necessary to provide a maximum retention capacity of 230,000 cu ft of water, and that the maximum retention would be required at the end of one hour based on previous rainfall records. It was our intent to provide a discharge rate of 25% of any future rainfall rate rather than attempt to maintain a discharge rate based on any previous rainfall rate. It was our purpose to prevent any increase in storm damage potential over the condition which prevailed before the site was developed.

Several factors must be considered in the selection of a suitable retention basin:

1. Location should be at or near the low point of the site.
2. Construction should be so as to preserve full utilization of the entire property for either parking or building.
3. It should be inaccessible to children or other curiosity seekers.
4. Esthetically, it should not be objectionable.
5. It should be economical to construct.

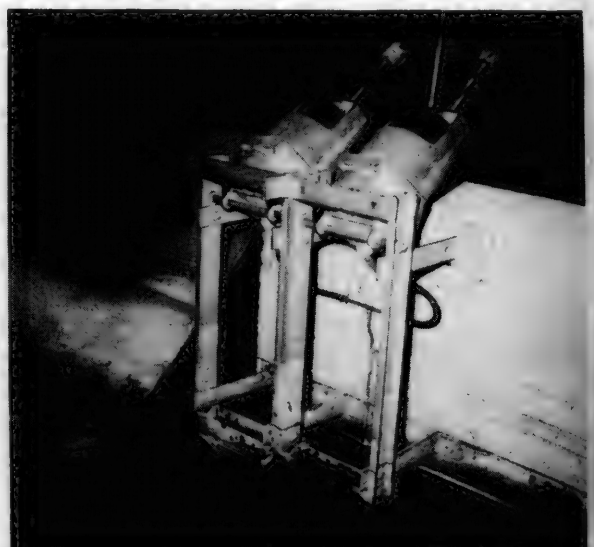
The location of the retention basin underneath a part of the large supermarket on the project fulfills many of the qualifications required. It is at the low point of the project; it is under a sales area and, therefore, does not use valuable space. It is inaccessible; it is in an area which requires footings to be carried down in any case due to the poor bearing characteristics of the soil in the area, and it is completely inconspicuous. By utilizing only 20,800 sq ft of the area under the supermarket for the retention basin, adequate additional space was left under the market for the heating plant and pumping equipment for the entire project.

Cooling Tower for Center

The Seven Corners project has an ultimate capacity of 3,000 tons of air conditioning or a system equivalent to the evaporation of over 20 tons of water every hour. Furthermore, to actually effect the evaporation necessary for the removal of heat, it is necessary to construct a device that has certain things in common with a retention basin.

A cooling tower must have considerable volume, must be located so as not to utilize valuable space, must be esthetically acceptable, must be constructed so as to provide maximum economy, both in first cost and in operation, and must be provided with copious quantities of air as well as a considerable amount of make-up water. It was determined that by some slight modification of the retention basin, a structure could be built that would be ideally suited for use as a cooling tower. Furthermore, during periods of relatively frequent rainfall, storm water could be utilized for the cooling tower thereby avoiding the necessity of purchasing city water at 41 cents per 1000 gallons. The specific modifications necessary to make the retention basin serve as a cooling tower were as follows:

1. Air flow through the tower was accomplished by providing an air intake on the west side of the tower and air discharge on the east side. This location of air intake and exhaust utilizes, as fully as possible, the southwesterly prevailing breezes to assist air flow through the tower during the cooling season. A bank of propeller-type fans, with an ultimate capacity of 1,300,000 cfm of air, gives more than a little assistance to the prevailing breezes in accomplishing the required rate of air flow.
2. It is necessary for the water to come in close contact with the air in order to effect the necessary heat removal from the water. This was accomplished by the installation of four banks of sprays each bank having a capacity of 3,000 gpm or a total capacity of 12,000 gpm.
3. A hot well to receive water from condenser discharges.
4. A cold well to receive the water from the cooling tower pan.
5. Eliminator plates to prevent excessive loss of spray water from the tower.



One of two thermostatically operated devices for moving a gate which controls flow of water from a retention basin sump to hot well. Pistons operate on air pressure.

6. A storm water well with a screen to permit the initial discharge from the parking areas to be separated from the storm water which is subsequently utilized, and to prevent introduction of trash or other debris into the cooling tower area.

These modifications to the retention basin resulted in a concrete cooling tower. Much of the maintenance normally encountered with cooling tower installations was eliminated.

Original Design Plans

It is well that certain other considerations affecting the design be noted in order that an over-simplification of the installation is avoided.

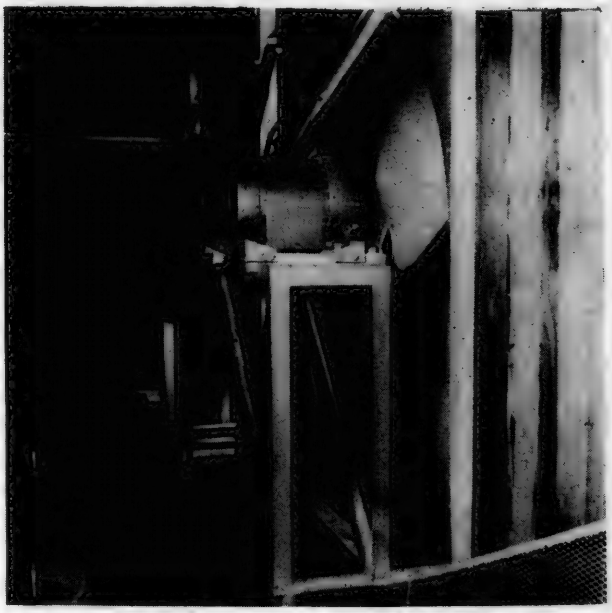
Our original concept was to utilize the storm water sewers for returning the condenser water to the retention basin cooling tower. This scheme was rejected for two specific reasons: (1) the temperature of the initial run-off of water from the parking lot during the course of a sudden shower would very likely cause severe overloading of the cooling capacity of the tower; water falling on the hot, paved surfaces during a rain, would not be able to remove heat by evaporation and most of the surface heat would be carried directly into the tower; (2) utilization of the storm sewers for the return of condenser water would have prevented us from separating the initial run-off from the parking areas, with a result that a considerable amount of grease and other debris would enter the cooling system.

Storm Water Well

The retention basin, as designed, actually causes all of the storm water to be discharged into a storm water well. This will receive several hundred thousand gallons before contamination with condenser water can occur. However, a special bypass gate is provided to permit the discharge of rain water into the cooling tower at any time the operator so desires.

Except for this one manual control of storm water to the cooling tower, the entire storm water operation of the retention basin is automatic. A discharge orifice is located near the bottom of the storm water well. This orifice is designed with an inverted V logarithmic curve so that a straight line float-actuated closing plate reduces the orifice opening as required to permit the proper discharge rate for various levels of water within the basin.

A 42 in. dia concrete pipe runs under retention basin floor to divert storm water from other sources, not in project. Rectangular opening shows variable notched orifice for flow regulation.



A bank of propeller-type fans provides air flow through the tower. Each fan handles 65,000 cfm and is operated by 10 hp motors. Fans have 60 in. dia blades.

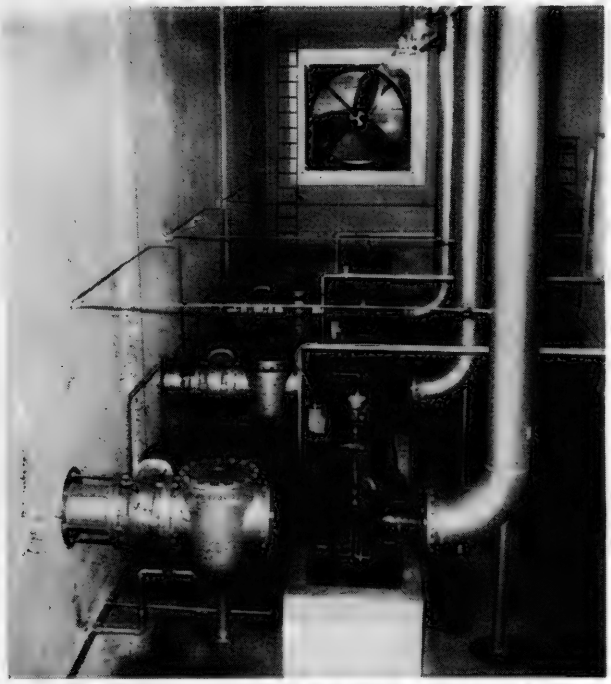
Water Treatment

Careful consideration was given to water treatment within the tower. It was concluded that sodium chromate, with periodic chlorination for control of algae, coupled with careful screening of the water, would provide satisfactory operating conditions. Examinations, after several months of operation, indicate that our original conclusions in this matter have been corroborated. Several of the tenants within the project require year-around operation of the air conditioning or refrigeration equipment. This is accomplished by circulating water through the hot well and cold well, resulting in sufficient heat dissipation so as not to require the utilization of the main cooling tower fans and spray pumps for normal winter operation. Observations have indicated that several hundred tons of air conditioning capacity can be obtained from the tower for occasional warm days during the nominal winter cycle. This has a decided advantage in a shopping center located where the temperatures in November, December and January may well soar to 80 deg during Christmas or other holiday shopping periods.

Automatic Operation

The entire plant operation is fully automatic. As mentioned previously, the flow of storm water through the retention basin is automatically controlled so that the discharge rate is proportional to the maximum run-off rate permissible. A float-actuated automatic valve provides additional make-up water to the cooling tower section whenever the level drops below a pre-determined point. The operation of the cooling tower plant is as follows:

Each condenser throughout the entire project has a water-regulating valve so that the flow of condenser water



View of spray water pumps. Each pump handles 3000 gpm at 50 ft head. Fan in background is for machine room ventilation.

through the condenser for each compressor is proportional to the actual load imposed upon the machine. The purpose of these valves is to minimize the amount of water which must be pumped through the project by making the flow proportional to the actual refrigerating load imposed upon the system. This prevents abnormally low head pressures on the condensing units during periods when relatively cool rain water is circulated through the system. Utilization of the condenser water regulating valves permits the system to be operated similar to a city water supply.

The smallest pump is a 60 gpm "slave" pump which maintains pressure on the system, and which provides water for the condensing units operated in the winter time. When the load exceeds this 60 gpm pump capacity, a 1,000 gpm pump comes into action, and the 60 gpm pump shuts off. When the capacity requirements exceed a 1,000 gpm pump, a 2,000 gpm pump comes into action and additional pumps are brought on the line with the 1,000 gpm pump acting as a step so that the increase rate is in 1,000 gpm increments with the exception of the 60 gpm minute pump which functions when the other pumps do not operate.

Water from the condensers discharges to the hot well. During winter operation, the water is permitted to flow directly from the hot well to the cold well. During normal operation, the hot well pumps and cooling tower fans are actuated by float controllers and arranged so they will be in sequence to discharge water through the spray heads in the various sections of the tower. Two thermostatically-operated bypass gates permit water to flow from the cold well into the hot well should the temperature in the cold well exceed a predetermined value. This increases the rate of operation of the tower by increasing the flow rate through the tower.

In the final analysis, this tower has been a source of great satisfaction to its designers because it has permitted that which pleases all engineers—the optimum utilization of the site, of the structures, and of the equipment to provide the maximum results for the client at the minimum cost.

Bag System Handles Dust from Electric Furnaces

A giant vacuum cleaner that uses 780 15-foot bags and that occupies its own four-room building has been installed at the Torrance, Calif., plant of The National Supply Company as part of a $125,000 system which serves the electric melting furnace department. It can move 75,000 cfm of dust-laden air compared to 28,000 cfm by the system formerly used.

Ducts over each of the electric furnaces carry all smoke from the melting operations to the new building known as a "baghouse," where in each room are suspended 195 dacron bags, 15 feet long and 6 inches in diameter. These bags collect all the dust from the air that passes through them. Once an hour, one room at a time is automatically shut off from the system for ten seconds, during which the bags are shaken vigorously, causing the dust to fall from them into a collecting hopper at the bottom. From this hopper, the dust is carried by a conveyor to a discharge chute where it is mixed with water to form sludge. At intervals the accumulated sludge is hauled away to a dump.

The former system used close-fitting collecting hoods mounted on top of the melting furnaces. From these hoods, the dust-laden air was carried by ducts to a large collector in which it passed through a curtain of water. Only small quantities of the finest particles of dust escaped to the air, but these caused a visible discharge that brought complaints of air pollution.

Another disadvantage of the former system was that its smaller capacity prevented collection of the quantities of smoke that result when gaseous oxygen is injected into melting furnaces. Because of this, the plant could not use the gaseous oxygen method, employed by most steelmakers, which results in greater melting efficiency. With the new system, gaseous oxygen can be used with no danger of air pollution.

The new system was engineered by the H. J. Horrell Company, Los Angeles, in cooperation with the engineering department of the plant. The baghouse was designed by the Dracco Corp., Cleveland.

The Torrance plant has three electric melting furnaces, with capacities up to 50,000 pounds per heat, as well as a foundry. It also has facilities for forging, heat treating, plating, welding, and machining steel, and assembly of machinery.

The plant was established in Torrance in 1912 as that city's first industry and has grown to include 33 principal buildings on a 39-acre tract. Conscious of its responsibility to the community, the management has been conducting a war on pollution for many years.

Telephone Exchange Operation Improved by Air Conditioning

A 14-story telephone exchange building is air conditioned by a chilled water system. Each floor has an individual air handling unit.

WITH the expansion of facilities in telephone exchange operation has come the introduction of extensive systems of intricate and delicate relays and switches that are in constant operation. The performance of these devices, similar to electronic computers or data-processing installations, may be affected to some extent by high humidity and dust. To control these conditions and to improve working conditions in the area, year-round air conditioning provides cooling and dehumidification during hot weather, heating and humidification during cool weather, filtering and air circulation throughout the year.

Two hermetic centrifugal refrigeration machines, each 300 tons capacity, provide chilled water for air handling stations on each of 14 floors.

In 1950 long distance dialing equipment was installed in the Toll Building of Southern Bell Telephone and Telegraph Company, Atlanta, Ga. This equipment generates a great deal of heat in its operation. Dehumidification was introduced as a safeguard for the equipment as well as to improve working conditions.

Chilled Water System

Five years later, Southern Bell decided to install a complete central station air conditioning system using chilled water. The design called for two 300-ton Carrier hermetic centrifugal machines located in the sub-basement.

With a combined cooling capacity of 600 tons, these two machines have the ability to adjust automatically to cooling loads varying from 10% to 100% of their capacity.

Electronic controls insure a matching of the machines' capacity to the momentary load. This fact is of importance to the operation of a telephone equipment building where some switching rooms are in operation 24 hours a day, in contrast with the business office areas which functions 8 to 9 hours per day, 5 days a week. Heat loads and corresponding cooling requirements of the entire building are in a constant state of change.

As an example: Portions of the building contain equipment for long distance transmission between cities. With the use of thousands of vacuum tubes, congested in several hundred square feet of space, heat up to 60 watts per square foot is found in some areas. Electronic toll translator equipment releases as much as 1000 watts of heat per hour per machine.

Automatic Operation

When the building's cooling requirements decrease, the refrigeration machines automatically throttle down. If the refrigeration load drops to a certain point, one machine shuts off. When the number of telephone calls increases, with a corresponding increase in telephone switching equipment activity, the second machine starts automatically producing cooling, in accordance with demand.

Water chilled by the refrigeration machines is pumped at the rate of 3200 gpm to 14 individual air handling units—one on each floor. Since every floor has different heat load characteristics, Newcomb and Boyd, consulting engineers, designed the system as if there was a separate system for each of the 14 floors. Where areas of any one floor differed in air conditioning requirements, a multi-

Cooling tower on the roof of the Southern Bell Toll Building handles 3200 gpm.

zone air handling unit is employed. Floors with uniform heat loads are served by single zone units.

In areas with switching equipment only, 10% outside air (in heavily populated switchboard areas, 25% outside air) is drawn in through manually-operated dampers, mixed with return air, and passed through a bank of dry-type filters, then into the fan. A fan blows the air across the surface of a cooling coil containing chilled water. Rooms are pressurized to prevent the infiltration of untreated air through windows and door openings.

Design of the air handling system was guided by two factors:

1. The present 14-story building may eventually undergo additional construction, therefore no exterior surface was available for one huge air shaft.
2. Space was not available for installation of vertical risers within the building.

The remaining solution, as mentioned, was the use of individual air units on each of the 14 floors.

Existing ventilation shafts were utilized and loss of crucial operating space was kept to a minimum. On some floors switching equipment rises to within 11 in. of the ceiling, making it necessary to restrict ducts to a depth of 8 inches.

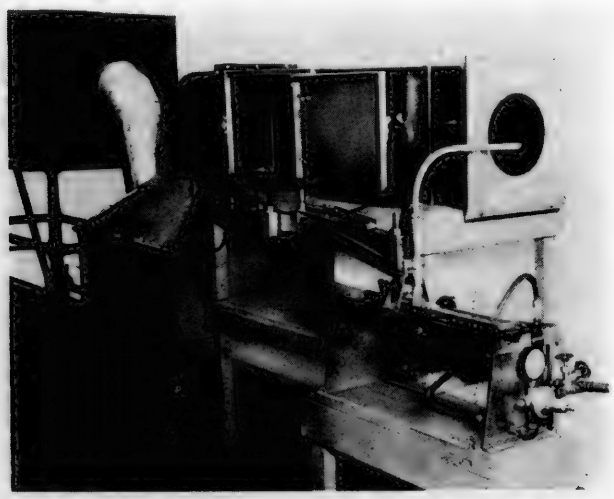
Method for Determining Removal of Pollen from Air

A subject of recurring interest is pollen, for upon it hinges the comfort of thousands of people afflicted with seasonal allergies, most notably hay fever. To provide the air conditioning industry with a means of ascertaining the effectiveness of air filters in removing this undesirable ingredient from incoming air, Electrical Testing Laboratories, Inc., New York, N. Y., has devised a special test procedure.

How Tests Were Made

Tests are conducted within a horizontal sheet metal duct measuring 11¾ in. x 14¼ in. in cross section and 53 inches in length. An end plate having an 8 in. dia hole is secured over one end of the duct and the other end connects with a plenum which discharges into an air measuring chamber. This chamber is provided with a fan which draws air through the duct at 300 cfm.

The filter to be tested is mounted inside the duct, at any desired angle with the air stream. Edges of the filter are sealed so that all of the air drawn through the duct passes through the filter.



Left to right, air measuring chamber, plenum chamber, test duct, and pneumatic tube which discharges pollen into duct.

Pollen enters the air stream by a small pneumatic tube extending into the duct through the opening in the end plate. The other end of the tube connects with an air compressor which supplies dry, filtered air at 60 psi. Pollen is introduced into the tube from a burette, the point of which penetrates the wall of the tube near the entrance to the test duct. The air flow through the tube draws pollen from the burette and discharges it into the duct.

Pollen Feed

Pollen is fed into the duct at the rate of 250 mg per hr. At this rate, based on experimental runs, approximately 2000 grains per square centimeter will collect on microscope slides placed ahead of the filter. These slides are lightly coated with grease to facilitate collection.

To determine the effectiveness of the filter, grains of pollen which pass through it are collected and counted and a comparison made with the pollen count originally injected into the air stream. Microscope slides are mounted on inner and outer arms of a 16 rpm rotator and enable complete traverse of the duct area.

Following the test run, slides are stained in a conventional manner with a few drops of Calberla solution to intensify the color and simplify detection of the pollen grains. Slides are then placed under a microscope and the grains counted.

Air flow is measured by a standard air flow meter using a conical orifice, pitot tube and inclined-type draft gages.

Similarity of Tests

The pollen test is a modification of the Air Filter Institute's dust test method and employs much of the same equipment, although methods of delivery to the air stream differ as do methods of collecting and measuring particles which pass through the filter. Because of their similarity, both tests may be run in conjunction with one another with a minimum of set-up time to determine the effectiveness of filters in separating pollen from the air stream when the filter is clean and when it is "loaded" with dust.

Additional information regarding the test may be obtained from the Electrical Testing Laboratories, Inc.

ESTIMATING SEWAGE QUANTITIES

Where there are water meters in existing buildings, the quantity of sewage may best be estimated from the recorded meter readings.

In using water-meter readings for estimating the quantity of sewage to be contributed, some allowance should also be made for maximum conditions that may not be readily apparent from the readings. For example, water consumption by an ordinary family of four in an apartment building may average 48 gallons of water per person per day over a period of 3 months, but actually range from perhaps 30 gallons per person on certain days to something in excess of 80 gallons per person on days when water consumption is heaviest, as on washdays. Besides these peak loads, some allowance should be made for the sewage contributed by occasional guests. Therefore, when computing sewage flows from average meter readings, a minimum factor of safety of about 25 per cent should be allowed to cover the range of variations. Accordingly, the design of a disposal system for the apartment house referred to, where the average usage is 48 gallons per person per day, should be based upon a computed maximum usage of at least 60 gallons per person per day.

Conversely, unusually high meter readings may be caused by lawn sprinkling or by leakage of water that does not enter the disposal system. Due allowances should be made for abnormalties of this kind.

Where measurements of water consumption are not possible, as where water-meter records are not available, or where disposal facilities are being planned for a new building, it is necessary to use other methods of estimating the amount of sewage to be discharged One way of doing this is to base the computed flow on the number of bedrooms. Another way is to compute the flow on the basis of the number and kinds of plumbing fixtures. If the building is used as a restaurant, the number of patrons or the number of meals served may be the best criterion. The competent designer will base his estimates upon a combination of the various influencing factors. He will consider each case on its own merits, especially when disposal facilities are being designed for a large institution where the cost of construction will amount to a considerable sum. If definite information and accurate water measurements are not available, the quantity of sewage may be estimated from experiences at establishments similar to that for which the new sewage-disposal facilities are intended. Table 1 may be helpful in such cases.

The quantities listed in the table are merely the best averages available, and they should be modified in localities or establishments where experience indicates a need for so doing.

It is sometimes economical and advisable to construct separate disposal systems for different types of wastes at a given establishment. The decision as to the number of disposal systems may be influenced by conditions of terrain, topography, and locations of the buildings contributing to the wastes. At large camps, for example, and at some resorts, kitchens and central dining facilities may be located at appreciable distances from the barracks or cottages and cabins. Under such circumstances, the kitchens may be provided with separate disposal systems, including facilities for the removal of grease ahead of the septic tank. Separate systems may also be used for community bathhouses. When this is done, the total per capita flow must be broken down into its component parts, and some allowance should be made for the amount of sewage tributary to the different disposal systems. Table 2 illustrates how this may be done where there are no definite data as to the exact distribution of flow.

For certain types of new establishments, the designing engineer may be unable to obtain from his clients accurate estimates as to the number of patrons to be served by the disposal facilities. This is particularly true in the case of restaurants and at recreational places, such as picnic areas, country clubs, and the like. In such cases, computations and estimates may best be made from the number of plumbing fixtures installed. Table 3 indicates average values for quantities of sanitary wastes per fixture at country clubs with modern plumbing.

Estimates of sewage quantities from golf clubs should be checked and calculations based on the weekend population. Allowances of 10 gallons per person for showers and 7 gallons per person for toilet and kitchen wastes, both for the average weekend population, have been found reasonable.

Table 3 also shows one method used in estimating the amount of sewage discharged hourly during the hours when public parks are open. Similar figures may be used for fairgrounds, carnivals, ball parks, etc.

The foregoing data are those of the U.S. Public Health Service.

Table 1. Unit Quantities of Sewage Flow

Type of Establishment	Gallons per Person per Day
Small dwellings and cottages with seasonal occupancy	50
Single-family dwellings, year-round occupancy	75
Multiple family dwellings and apartments	60
Rooming houses	40
Boarding houses	50
Additional kitchen wastes for non-resident boarders	10
Hotels without private baths	50
Hotels with private baths (2 persons per room)	60
Restaurants (toilet and kitchen wastes per patron)	7 to 10
Restaurants (kitchen wastes per meal served)	2½ to 3
Additional for bars and cocktail lounges	2
Tourist camps or trailer parks with central bathhouse	35
Tourist courts or mobile home parks with individual bath units	50
Resort camps (night and day) with limited plumbing	50
Work or construction camps (semi-permanent)	50
Day schools without cafeterias, gymnasiums, or showers	15
Day schools with cafeterias, gymnasiums, and showers	25
Boarding schools	75 to 100
Day workers at schools and offices, gallons per person per shift	15
Hospitals	150 to 250+
Institutions other than hospitals	75 to 125
Industrial plants (exclusive of industrial wastes), gallons per person per shift	15 to 35
Picnic parks (toilet wastes only), gallons per picknicker	5
Picnic parks with bathhouses, showers, and flush toilets	10
Swimming pools and bathhouses	10
Luxury residences and estates	100 to 150
Country clubs (per resident member)	100
Country clubs (per non-resident member present)	25
Motels (per bed space)	40
Motels with bath, toilet, and kitchen wastes	50
Drive-in theaters (per car space)	5
Movie theaters (per auditorium seat)	5
Airports (per passenger)	3 to 5
Self-service laundries (gallons per wash; i.e., per customer)	50
Stores (per toilet room)	400
Service stations (per vehicle served)	10

Table 2. Distribution of Sewage Flow by Type

Type of Waste	Total Flow, Gallons per Day per Person				
	30	40	50	75	100
	Volume, Gallons per Day per Person				
Kitchen wastes	0[1]	7	10	10	15
Toilet wastes	15	15	20	25	30
Showers and wash basins	15	18	20	25	35
Laundry wastes	0[1]	0[1]	0[1]	15	20

Table 3. Sewage Flow from Country Clubs and Parks

Type of Fixture	Country Clubs[2] Gallons per Day per Fixture	Public Parks[3] Gallons per Hour per Fixture
Showers	500	150
Baths	300	—
Lavatories	100	—
Faucets	—	15
Toilets	150	36
Urinals	100	10
Sinks	50	—

[1] No wastes from these uses. [2] For golf clubs, calculations should be based on week-end population. Allowances of 10 gallons per person for showers and 7 gallons per person for toilet and kitchen wastes, based on average week-end population, have been found reasonable. [3] Figures apply to hours when park is open. These data may be used for fairgrounds, carnivals, and ballparks.

A former cotton field is the site of the General Electric plant at Tyler, Tex.

Small Home Units Used by Factory for Heating and Air Conditioning

A large manufacturing plant in Texas is producing small units to air condition and heat homes. These same units are installed in groups on a mezzanine to cool or heat the plant. This installation also serves to provide manufacturer with continuous operating data regarding this equipment.

OVER 300 three and five-ton capacity home cooling units constitute the air conditioning system for General Electric Company's new equipment manufacturing plant at Tyler, Tex. Heating for the 380,000 sq ft manufacturing center, including engineering laboratories and a two-story shop and office section, is furnished by small home-type GE gas-fired warm air furnaces and hot water boilers.

This heating and air conditioning system was designed by Walter Kidde Constructors, Inc., New York, in conjunction with GE engineers. Purpose of the installation was twofold: (1) to achieve an efficient system for the plant itself, using GE home equipment actually manufactured at Tyler; (2) to obtain continuous testing of the equipment at extremes of temperature and humidity of Texas weather.

While the system may not be practical from a cost standpoint for the average plant, it makes excellent sense at Tyler. The equipment is available at manufactured cost and has additional value as test equipment from which continuous operating data may be drawn. Piping and auxiliary requirements, while different from those of a standard central system, are kept to a reasonable minimum by careful design.

The task of heating and ventilating a large industrial building with small equipment, admittedly an unusual one, requires attention to best space utilization, shortest piping runs and best grouping of equipment.

Design Considerations

First area to come under consideration was the 540 x 300 ft factory section. It was apparent from the beginning that a mezzanine or balcony location for the equipment was desirable to save space in the factory area and to make duct runs to overhead diffusers as short as possible. A parallel arrangement of air conditioning units was chosen, since condenser water, drains, electricity, and fresh air supply could be run in straight lines between equipment. For specified factory temperatures (78 deg F summer, 70 deg winter), diffuser spacing worked out to be approximately 30 x 20 ft, based on capacity of the 5-ton cooling units. Table 1 lists capacities of units for various operating conditions.

Since one row of cooling units has approximately one-fourth the total cooling capacity required for the factory, a three-mezzanine arrangement was chosen, the center mezzanine containing parallel rows of coolers on both sides. The mezzanine is 25 ft above the floor. A general arrangement is a row of four cooling units, a gas-fired warm air furnace, and another line of four cooling units. This worked out well both from the standpoint of shortest ductwork runs to diffusers and best spacing of the furnaces, which required diffusers on 60-foot centers for winter heating.

Both air cooled and water cooled air conditioners are used in the factory area. The water cooled air conditioners contain an integral fan, coil, compressor and condenser. Air cooled units are two-section equipment,

View of the balcony on which are located the home air conditioning units. Location shortens duct runs and saves space in factory area.

containing an integral fan and coil section and an air cooled condenser and compressor unit.

In both cases, fans are controlled manually or automatically in groups. Room thermostats throughout the factory area control the compressors of groups of cooling units for summer operation. During winter, the fans will be operated manually for ventilation.

Center mezzanine coolers are recirculating units only, while coolers on the east and west wall balconies are combination recirculating and fresh air units, receiving outside air from four heating and ventilating units, two on each balcony. Groups of three gas-fired steam boilers, 345,000 Btu output capacity each, feed into a common header and supply steam to each heating and ventilating unit. The combination of units and steam boilers supplies 74,000 cfm of fresh air (70 deg F in winter, ambient in summer) to the air conditioning units. Manual dampers at each supply air connection allow the units to be balanced against each other for fresh air quantity.

Office and Engineering Laboratories

Coolers and gas-fired furnaces serving office and laboratory sections of the building are grouped in equipment rooms on the first and second floors. Primary reasons for the arrangement are flexibility and ease of maintenance.

Whether appliances were grouped centrally or located in using areas, total system piping and ductwork would have been approximately the same. In one case ductwork would have been decreased but services to the equipment would have been greatly increased. In the present arrangement, services (condenser water, drains, electricity, and fresh air) are centralized but ductwork is more extensive. However, the present system has the advantage of centralizing all maintenance and inspection of equipment. Equally important, future movement or subdivision of office and laboratory space will involve only a change in ductwork and not in service piping and appliances.

All office and laboratory system cooling units are water cooled units, each with a supply duct and ceiling diffusers. The coolers function as combination recirculating and fresh air units, receiving outside air from two centrally located heating and ventilating units. The equipment rooms which house the cooling units are used as plenum chambers, the air conditioning units picking up the return air from the plenum.

System for Offices

Air conditioning of the executive offices and the building lobby is supplemented by the Air Wall system, consisting of a combination water cooled air conditioning unit and gas-fired warm air furnace. The combination unit has a heating and cooling thermostat which controls the gas burner on the furnace and the compressor on the cooling unit.

Office systems receive air through round ducts and registers located below the windows. In the lobby, round ducts are located below the floor slab and registers are placed around the perimeter of the lobby under the glass. Air is returned to the units from the lobby by means of a ceiling register and ductwork.

Base heating of the office areas is by finned tube radiation located below the windows except for executive offices and the lobby, which are heated by the air system. Where finned tube radiation is used, gas-fired hot water

TABLE I.—CAPACITIES OF HOME COOLING UNITS DELIVERING 2000 CFM TOTAL AIR

Outside Air Conditions are 100 Deg DB, 78 Deg WB

Room Cond.		%	Mixt. Cond.		A. C. Unit Cool Cap, Btu			Fresh Air Load, Btu			Room Cooling Load, Btu			Area Served
DB	WB	F. A.	DB	WB	Sens.	Latent	Total	Sens.	Latent	Total	Sens.	Latent	Total	
76	63	10	78.4	64.5	43550	13900	57450	5200	5900	11100	38350	8000	46350	Gen Offices and Labs.
		20	80.8	66.0	45050	14120	59170	10400	11800	22200	34650	2300	36970	
		30	83.2	67.5	47150	14475	61625	15600	17700	33300	——	——		
		0	76	63	42300	13400	55700	——	——	——				
72	60	10	74.8	61.8	41125*	12300*	53325*	6050	6950	13000	35075	5250		Private Offices
		20	77.6	63.6	43725	12665	56390	12100	13900	26000	——	——		
		30	80.4	65.4	45300	13130	58430	18150	20850	39000	——	——		
78	66.5	10	80.2	67.7	40920	20050	60970	4750	4300	9050	36170	15750		Factory
		20	82.4	68.8	43000	19600	62600	9500	8600	18100	33500	11000		
		30	84.6	69.9	45000*	17000*	62000*	14250	12900	27150				
		0	78	66.5	38000	22000	60000	——	——	——				

Note: All capacities are as listed by G.E. unless otherwise noted.
* Estimated capacity.

boilers are used with circulators, one circulator handling the water from one boiler and a corresponding amount of radiation.

To regulate office heat, an electronic panel coordinates signals from an indoor-outdoor air thermostat to reset an immersion thermostat in the hot water supply line. The resulting signal operates a three-way mixing valve, maintaining supply water temperature according to a predetermined schedule. In addition, indoor-outdoor thermostats, controllers and an aquastat in the control line are set to regulate pump and boiler operation to maintain desired temperatures.

System Services

The plant condenser water system is primarily designed to supply condenser water for the package air conditioning units, although it is also used to supply water to other equipment in the factory and laboratory areas. The system consists of a two-cell cooling tower designed to cool 3600 gpm of 105 deg water to 85 deg with a 78 deg wet bulb temperature, four condenser water circulating pumps, three operating and one standby. Each pump is sized to circulate 1200 gpm through the system.

Water is piped from the compressor building, where the pumps are housed, via a bridge over the roadway, to the plant, where it is distributed to equipment and back to the cooling tower. In the factory area plugged outlets on 60-foot centers are provided in the supply and return mains to allow flexibility in the system for condenser water requirements. City water is provided to the cooling tower through a float-operated make-up valve to compensate for drift and evaporation losses.

Four air compressors, capacity 340 scfm at 100 psig, and auxiliary equipment are installed in the separate compressor building, with provisionary space for four additional compressors with individual after coolers. The system supplies compressed air at 100 and 400 psi and at minus 40 deg dewpoint to the factory and laboratories.

Separate fuel oil and butane storage and distribution systems have been provided to supply oil and gas to the engineering laboratory for testing purposes.

Services enter the main building through overhead piping. Louvered intakes admit fresh air for air conditioning, heating and ventilating systems.

Process Air Conditioning

Process air conditioning is necessary during certain stages of the equipment manufacturing process. A Kathabar unit using lithium chloride as the absorbing agent is used with and without a refrigeration cycle, depending upon the process. The chemical regenerator uses steam from gas-fired steam boilers; the boilers also supply steam to the pre-heating coils. Air cooling is accomplished with direct expansion coils. Where refrigeration is required, the coils operate in conjunction with a duplex refrigeration compressor and water cooled condenser. The compressor, which has four steps of unloading, operates on suction pressure and is interlocked with the condenser water system through a differential pressure control.

Hazards in the Handling of Hydrogen Peroxide

Although hydrogen peroxide, as purchased from the corner drug store by women for producing blond coiffures, has been in common use for many years, this same liquid in its concentrated form can be a health hazard to the industrial employee if not properly controlled.

According to a Hygienic Guide published by the American Industrial Hygiene Association, the maximum 8-hour exposure to 90% hydrogen peroxide is one part per million of vapor or mist per million parts of air by volume. However, it is believed that further industrial experience is needed to confirm this figure.

Hydrogen peroxide, 90%, the present standard commercial concentration, is a liquid at room temperature that is essentially odorless, but it can produce sharp respiratory irritation.

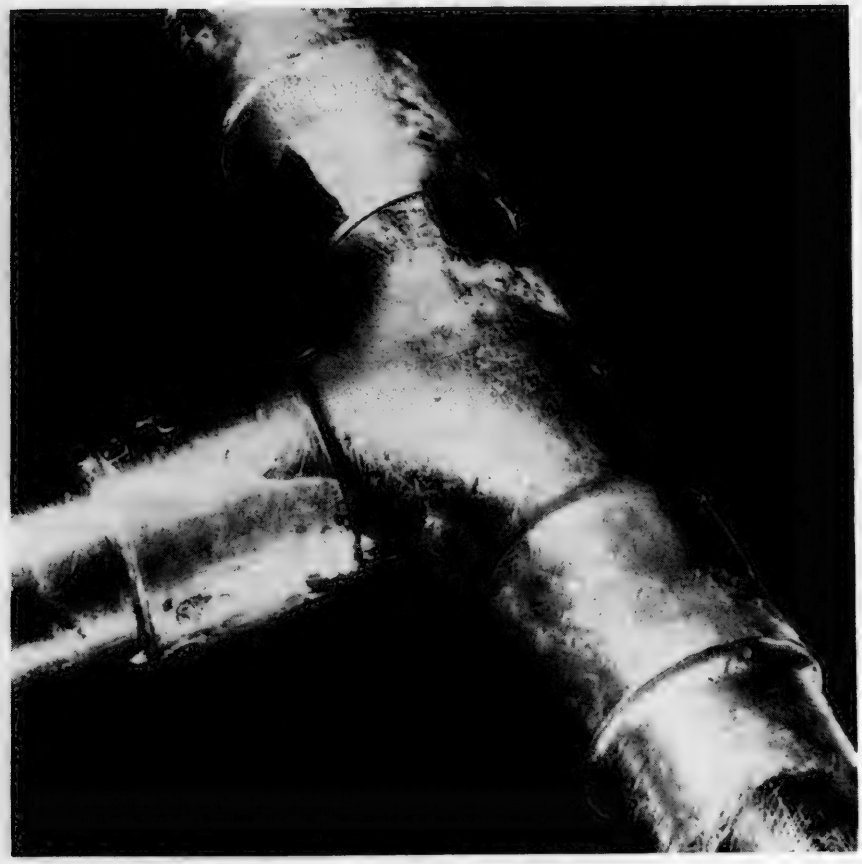
While health hazard through inhalation is moderate, skin and eye contact with the liquid is severe. It causes skin to become thickened, and bleaching and loss of hair occurs. Skin or eye contact with the liquid will produce tissue destruction, but the eyes do not appear to be damaged from exposure to the vapor.

Although the liquid does not have a fire hazard if kept out of contact with combustible material, it can ignite nearby flammable material.

Special procedures are required for storage and handling of 90% hydrogen peroxide. Workmen should wear protective clothing. Garments, both outer and inner, made of woven Dacron fabric are eminently suitable. Dynel or Saran fabrics are also usable. Impermeable aprons and the like may be made of polyvinyl chloride or polyethylene film. Gloves and boots should be made of either nitrile rubber, vinyl resin or Neoprene.

Goggles should be worn at all times when handling concentrated hydrogen peroxide. In case of spillage, the spot should be flushed immediately with water. If this flushing is done in time, it will prevent any vigorous reaction. Water is also the best extinguishing agent for fires that may result from spillage.

Hydrogen peroxide is used industrially in high energy fuels, as an organic oxidant bleaching agent, and in lesser concentration for pharmaceutical preparations.



How to Braze Copper Tube

ARTHUR I. HEIM
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MOST new hospitals, oral surgery clinics, and new factory and office hospitals are being equipped with central oxygen supply systems to pipe this vital gas to all parts of the building and eliminate the need for the handling of bulk cylinders. The same type systems are being installed in older hospitals as they are modernized. Even animal hospitals are being so equipped. Because of the peculiar demands of these systems and the fact that oxygen supports combustion, specifications for these jobs almost always call for the use of copper tube with brazed joints to carry and distribute the gas.

To the contractor that has been accustomed to using soldered joints, specifications calling for brazed joints need not cause concern. Many concerns have handled this work without difficulty. Brazing is called for because it will provide solid, gas and water-tight joints and because the fluxes used are not combustible. No leaks can be tolerated, for although oxygen is not combustible it will nurture any flame to which it is exposed.

Brazing is somewhat slower than soldering because of the higher temperatures required to do the work. In the case of copper tube for oxygen systems, caution is essential to make certain that the interior of all tube and fittings be absolutely clean and free of any oily substance. Oxygen under pressure forms an explosive mixture with either oil or grease, thus greasy tools and rags should not be used when this type work is being handled. This is also the reason why soldered joints are not used for oxygen lines, as the fluxes used for soldering may leave an oily residue.

Tubes and fittings for oxygen piping should be ordered specially cleaned for this type service. When so ordered and furnished, considerable care should be taken to prevent contamination of the tube during installation. If there is any question of the cleanliness of the tube after installation, it should be cleaned before use. If not previously cleaned the parts must be cleaned before installation. Oil, grease, and other combustible materials can be removed from tube, valves, and fittings by washing in a hot solution consisting of 1 lb of sodium carbonate or trisodium phosphate to 3 lb of water. If necessary the parts should be scrubbed to insure absolute cleanliness. After washing they should be rinsed in clean, hot water. Every precaution should be taken to keep the parts from recontamination after cleaning, and before and during installation.

Certain joints in oxygen piping systems require threaded joints, but with these exceptions, all joints are brazed.

Tube, Flux, and Alloy

Most specifications call for seamless copper tube, either type *K* copper water tube or threadless copper pipe *TP* (sometimes specified as type *B*). Hard temper tube

Flux should be applied carefully, making certain that none enters the tube itself. Joint is then assembled by inserting tube into fitting until it rests squarely into socket. Heat is first applied to tube. Flame is kept moving to heat tube evenly and prevent burning.

is recommended for lines within the building for new construction, and soft temper tube for underground installation. For installations in buildings being renovated or modernized, soft temper tube may be used in concealed locations, using hard temper tube for exposed lines. Sometimes red brass pipe is used. Fittings should be copper, brass or bronze, and, in the case of shut-off valves should be expressly made for oxygen service.

Brazing alloys have a melting point of 1000 deg or higher. The most frequently used alloy is a high-silver content alloy which melts at about 1175 deg. With this alloy it is necessary to use a flux of the alloy manufacturer's recommendation. Fluxes containing alcohol or other materials that are combustible in oxygen should be avoided.

Materials Prepared

When tubing is cut to the required length, caution should be observed to make certain that the ends are cut square and that all burrs are removed. The tube should

When fitting is at proper temperature, brazing alloy is fed into the joint area. Capillary attraction draws molten alloy into joint. With large diameter tube, it is sometimes helpful to use a double-tipped burner. Upon completion of brazing, joint should be cleaned of flux by swabbing or wire brushing.

be perfectly round to provide a uniform fit in the fitting. A sizing tool is helpful for this step, particularly when soft temper tube is used. Some people find it helpful to scribe a line near the end of the tube equal to the depth of the socket in the fitting plus one-eighth inch. This mark provides a visual guide to make certain that the tube is completely inserted in the fitting.

If after cleaning any foreign matter or oxide remains on the tube or in the fitting, it should be removed with fine sand cloth. Then flux should be applied immediately and used sparingly, taking care to prevent the flow of any of the flux to the inside of the fitting. One method frequently used to prevent over-fluxing is to insert the tube all the way into the fitting socket and then pull it half way out and flux only the exposed portion of the tube end. Next complete the assembly of the tube into the fitting, and if possible rotate the tube once or twice to insure an even spreading of the flux. Finally the assembly should be placed in its final position before brazing is started.

Technique of Brazing

Parts to be brazed should be heated evenly with a reducing flame. Heat should be distributed across the joint, with the heavier section being favored with the most heat. The flame should be moved constantly to prevent any over-concentration of heat. Oxy-acetylene is the preferred gas, although propane and other gases are sometimes used with small diameter tube.

When the flux starts to liquefy the brazing temperature is being approached. At this point a little alloy should be applied to the joint and torch movement continued. When the required temperature is reached the alloy will flow freely. At this time enough alloy should be added to form a slight fillet at the end of the fitting. The torch flame should then be moved toward the body of the fitting to draw the alloy to the bottom of the tube in the fitting socket. A fillet will not form until the alloy has completely penetrated the joint and so can be indicative of a satisfactory joint. Constant care is required to avoid overheating the alloy.

Brazing Large Tube

Sometimes when brazing joints in tube one inch in diameter and larger it is more satisfactory to braze in sections. Under these conditions the entire joint area is heated to brazing temperature, heating being confined to a part of the circumference. The section where brazing is to be done is then kept at proper temperature. When the flux becomes fluid, brazing alloy is applied and heating continued. When the alloy flows freely, additional alloy is added until a slight fillet is formed at the end of the fitting.

Moving to adjoining sections, heating is done in the same manner. There should be some overlapping of heating and alloy addition between the two sections so that there will be no possibility of a void in the joint.

After brazing, all fused flux residue should be removed from the joint by swabbing or brushing. All flux must be removed before inspection and pressure testing.

Several Tests Required

Before installation of outlet stations in the piping system, each section should be blown clear by using water-pumped (oil-free) compressed air, or nitrogen. It is essential that the air or nitrogen be absolutely oil-free.

When the section is completed, including the installation of station outlet valves, the section should be tested by means of water-pumped compressed air or nitrogen at 150 psi. Pressure should be maintained until the entire piping system is completed. Should the pressure drop more than would be normal because of temperature variations, a leak is indicated. Any leaks uncovered in a section in this manner must be repaired and test pressure reapplied. Soap water is the most satisfactory method of testing joints for leaks.

As a final test, the overall system should be given a twenty-four hour standing pressure test with water-pumped compressed air or nitrogen at 150 psi.

Test pressure should be maintained after a satisfactory final system test until the piping system is to be put into service. By maintaining the pressure test it is possible to be aware of any damage that might have been caused to the system by any other building operations.

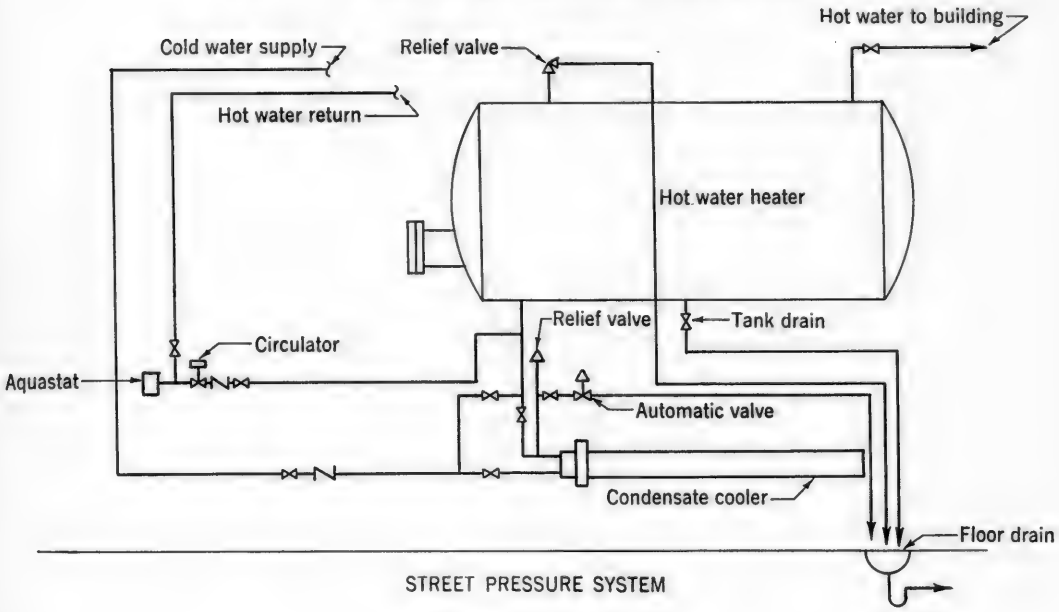
Finally, immediately prior to putting the system into operation, test pressure should be released and lines purged with U.S.P. oxygen. Purging should be continued at each outlet until the oxygen coming through is pure enough to use medically. Care should be taken to prevent any excessive concentration of oxygen in an enclosed area during purging.

White Paint on Bituminous Roofs Cuts Summer Temperature Peaks

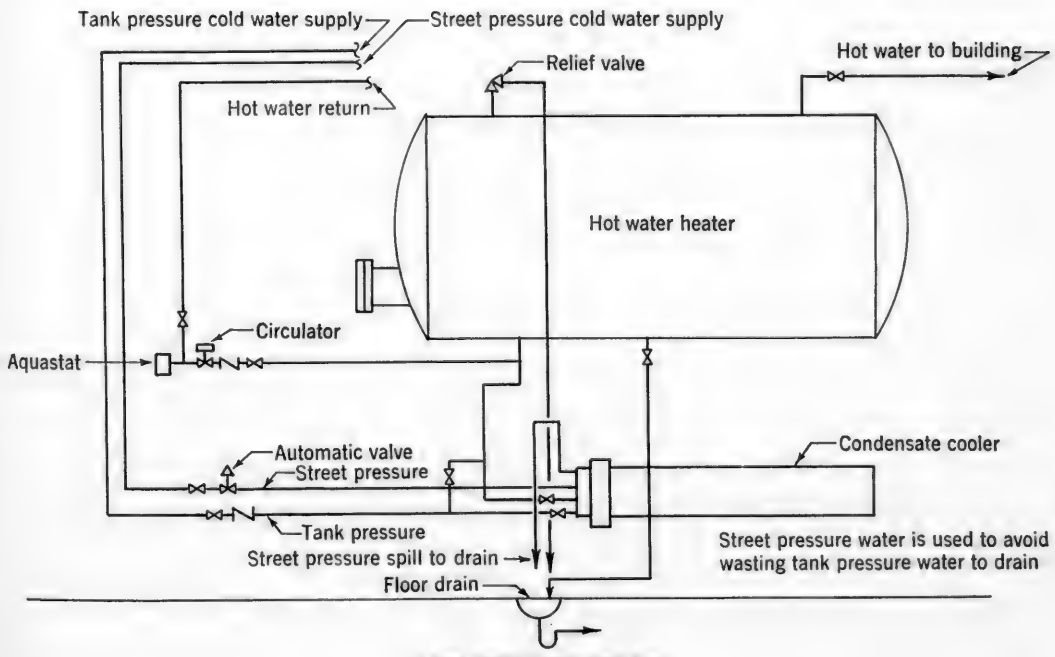
Records kept of surface temperatures on pitched and flat roof sections for one year of a building at Highett, near Melbourne, Australia, have produced some informative data on the temperature-reducing effect of covering bituminous roof surfaces with aluminum foil, aluminum paint, and white paint. Reporting in July, 1957 *ASTM Bulletin*, E. R. Ballantyne and John W. Spencer, Division of Building Research, Commonwealth Scientific and Industrial Organization, Highett, Victoria, Australia, describe recording apparatus, including thermocouples imbedded in the roofs, and printing recorder.

Plots of mean hourly temperatures for January (southern hemisphere summer) show reductions of 15 deg F or greater for white paint as compared to black surface for 10% of the time. A maximum reduction of 49 deg was recorded. Aluminum paint is not quite as successful, according to the report, but its far greater durability than the white paints used by the experimenters leads to its more general recommendation. Aluminum foil is better than aluminum paint; not so good a reflector as white, however. It is noted that surfaces other than aluminum foil are below air temperatures at night, due to radiation to the sky, but that aluminum foil, because of its low emissivity, equals or exceeds night air temperatures.

HOT WATER HEATER PIPING WITH CONDENSATE COOLER

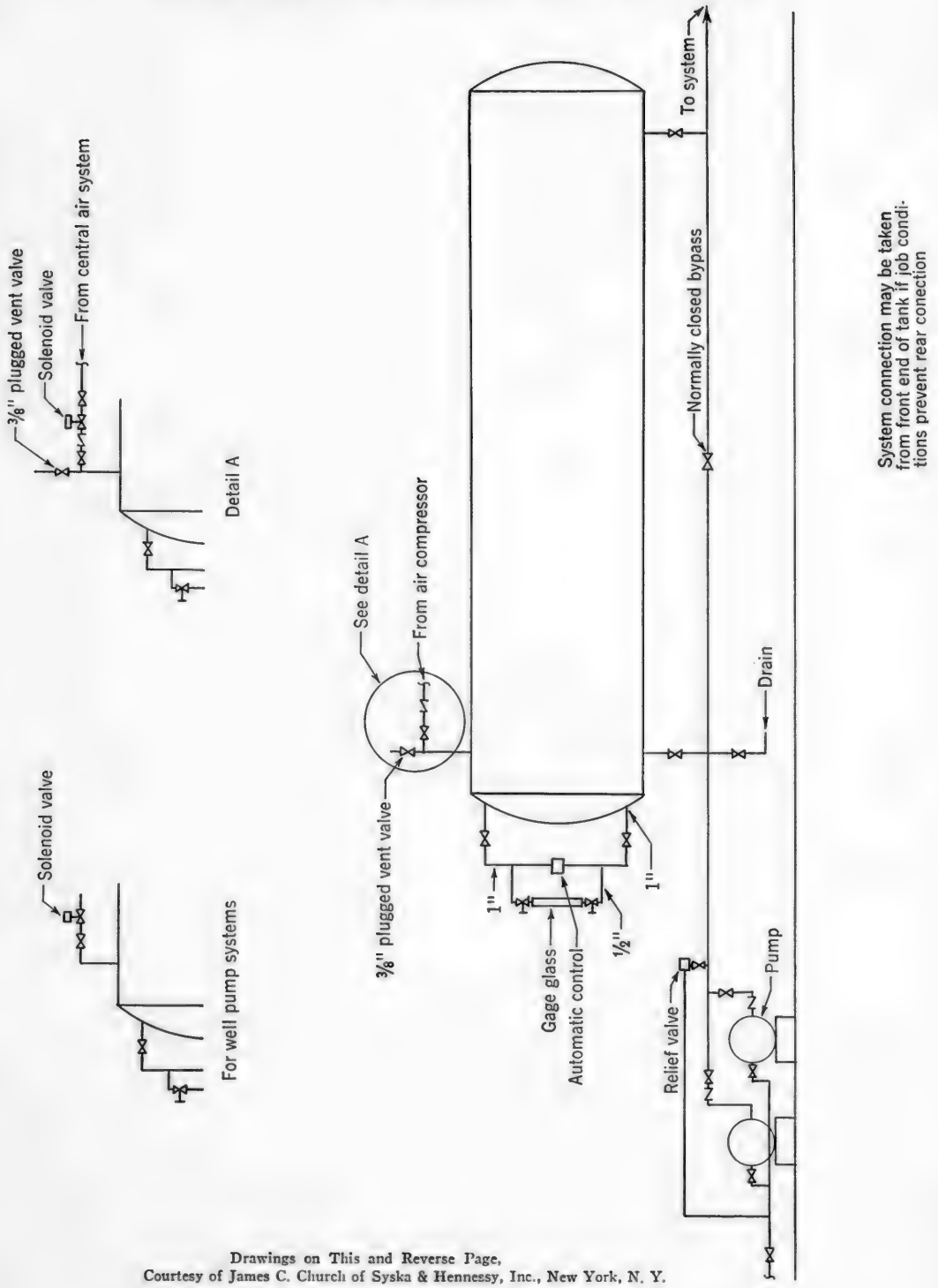


STREET PRESSURE SYSTEM



TANK PRESSURE SYSTEM

HYDRO-PNEUMATIC TANK PIPING



Drawings on This and Reverse Page,
Courtesy of James C. Church of Syska & Hennessy, Inc., New York, N. Y.

LOUIS BLENDERMANN ON

PIPING AND PLUMBING

Water Hammer Arrestors

ONE of the most damaging factors to a water piping system is water hammer action. In addition to its effect on the piping system, water hammer causes banging noises in the system that are very disagreeable to occupants in the building. Water hammer occurs when a column of water flowing through a pipe line and discharging at an open outlet, is suddenly stopped by closing the outlet. Since flowing water has force, tremendous pressures result at the point of closure and pressure surges move along the pipe. The manner in which water hammer occurs is illustrated in Fig. 1.

Steps that produce water hammer, shown in Fig. 1, follow.

Phase 1. The valve on the line is closed and the water contained in the line is at rest. Water pressure is thus exerted in all directions in an equal way.

Phase 2. The valve on the line is open and water flows freely through the open outlet. Now the water pressure is utilized to force the water out of the open end of the pipe. Arrows indicate the direction of force in the column of water.

Phase 3. When the valve is quickly closed, the column of freely flowing water is suddenly stopped; excessively high pressures are generated at the point of stoppage. This reaction is the same as would result if a steel bar moving through the line at the velocity of water were suddenly stopped by the valve.

Phase 4. In an effort to equalize the pressure build-up of the water, a shock wave will travel back along the branch line until a larger diameter pipe is reached. This will allow the shock wave to dissipate itself. Arrows denote the direction of force toward the valve and then its reversal as a shock wave toward the point of relief. Since the shock wave travels at speeds in excess of 4000 fps, it causes a piping clatter all along its route. Often the shock wave will oscillate back and forth between the valve and the point of relief until the pressure is stabilized within the branch line.

The pressure generated by the shock wave can expand and often rupture the piping. Although piping clatter is normally associated with water hammer, you cannot assume that when these noises do not occur, that the shock wave is non-existent. Quite often, water hammer takes place without any physical sounds. Therefore it is very important that piping systems be designed with all due consideration given to the means that compensate for the action of water hammer.

Causes of Water Hammer

Not all the noises heard in the piping system can be attributed to water hammer. Loose faucet or valve washers can cause a pounding or chattering in the piping. Improperly supported and secured piping can create noises as the flowing water causes the piping to vibrate and thus rattle against steel members. This noise is easily transmitted through the piping system. Undersized water piping with excessive pressures will produce shrill sounds. Then of course there is certain equipment, as pumps, that will produce noises unless the pumps are isolated and the piping connections are equipped with flexible piping connectors.

As for water hammer, it is generally impossible to predict just where in the piping system that water hammer will occur. There may be a small diameter branch line in the system which, by the nature of its length and the fixture it supplies should produce water hammer, yet it does not. However, a larger diameter line which should not cause water hammer, will.

One of the basic causes of water hammer is quick closing valves. These include any valve or faucet that is closed rapidly either by hand, spring loading or solenoid.

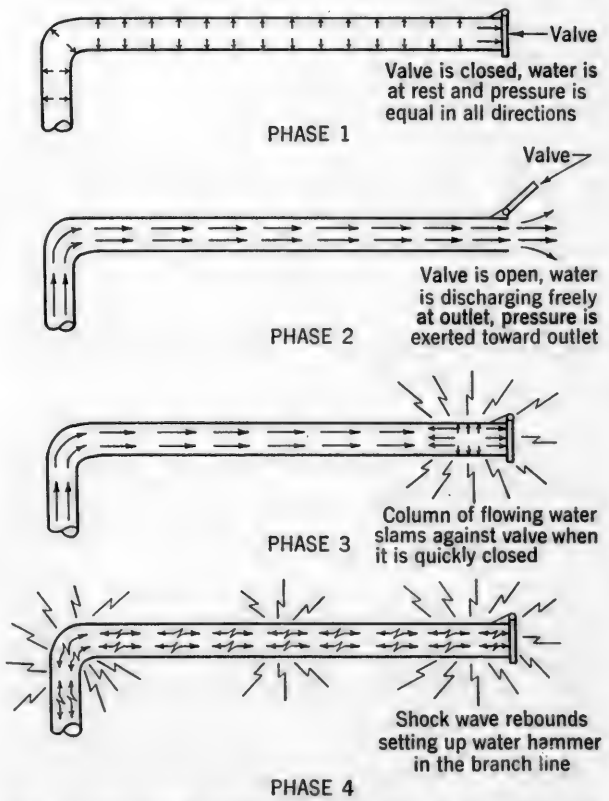

Valve
Valve is closed, water is at rest and pressure is equal in all directions
PHASE 1
Valve
Valve is open, water is discharging freely at outlet, pressure is exerted toward outlet
PHASE 2
Column of flowing water slams against valve when it is quickly closed
PHASE 3
Shock wave rebounds setting up water hammer in the branch line
PHASE 4

Fig. 1. How water hammer can develop in a branch line.

If the same valve were closed slowly, then the flowing water would have the chance to stabilize without producing the shock waves of water hammer. However, since these valves must function in the manner intended, other means must be employed to minimize the violent action of water hammer.

Other factors that contribute to the positive occurrence of water hammer are excessive water pressures, inadequate piping sizes and water piping that is improperly installed.

Methods of Controlling Water Hammer

In order to eliminate the danger and piping clatter that results from water hammer, it is important that certain steps be taken in piping system design to compensate for the excessive pressures that are generated when a column of flowing water is suddenly stopped.

The consideration needed is some means or device that will provide flexibility in the system to absorb the initial shock wave of water hammer thereby confining the action to a given section of piping.

Air is the most effective medium for absorbing the shock wave caused by water hammer for (1) water is non-compressible; (2) air can be compressed to considerable pressure. When the water compresses the air it also fills the void offered by the displaced air. Because water has this flexible means to expend its force, the shock wave that would otherwise result, is quickly absorbed. The manner in which air serves to eliminate water hammer is shown in Fig. 2.

Detail *A* in Fig. 2 shows water flowing in a branch line and discharging at an open outlet. Water in the line from *a* to *b* is at rest with very little pressure exerted on the air that is contained in the chamber.

Detail *B* illustrates the condition when the flowing water is suddenly stopped by the valve. The shock wave

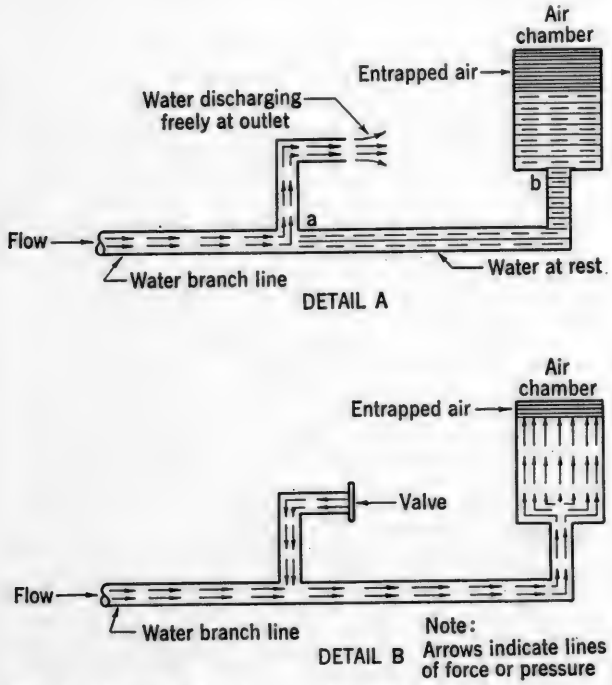


Fig. 2. How air chambers cushion the initial shock wave generated by water hammer.

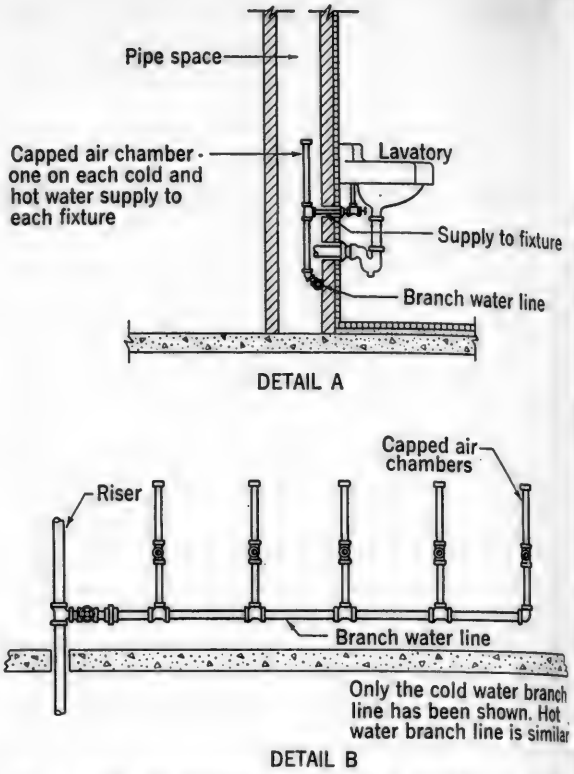

Pipe space
Capped air chamber - one on each cold and hot water supply to each fixture
Lavatory
Supply to fixture
Branch water line
DETAIL A
Capped air chambers
Riser
Branch water line
Only the cold water branch line has been shown. Hot water branch line is similar
DETAIL B

Fig. 3. How the capped air chamber is installed on branch water lines.

generated rebounds but is absorbed by the air in the chamber. Thus by absorbing the initial shock wave, the water pressure is stabilized and the occasion of water hammer has been removed. Both details are diagrammatic and have been used only for example in showing how the phenomenon of water hammer can be properly controlled.

The extent of water pressure in a given line and the required sizes of air chambers to absorb the resultant shock waves can be computed. Much research work was done and published by F. W. Dawson and A. A. Kalinske of the Iowa Institute of Hydraulic Research, on this subject of water hammer.

Simple Air Chambers

One of the methods that has been used for many years in the average building to protect the water system is the simple air chamber. This device consists of a short length of pipe installed in a vertical position at the top of a water supply to a fixture.

The upper portion of the chamber fills with air during installation. The entrapped air in the line is compressed until it is equal in pressure to the water contained in the line. As excessive pressures occur due to the quick closing of the valve or faucet at the equipment or fixture, the air will compress still further, allowing the water to fill the void left by the displaced air. Thus water hammer is avoided.

Figure 3 represents the manner in which this type of air chamber can be employed.

In Detail *A* of Fig. 3 the air chamber is placed at the top of the cold and hot water supply to the lavatory, which has been used for example here. The length of the

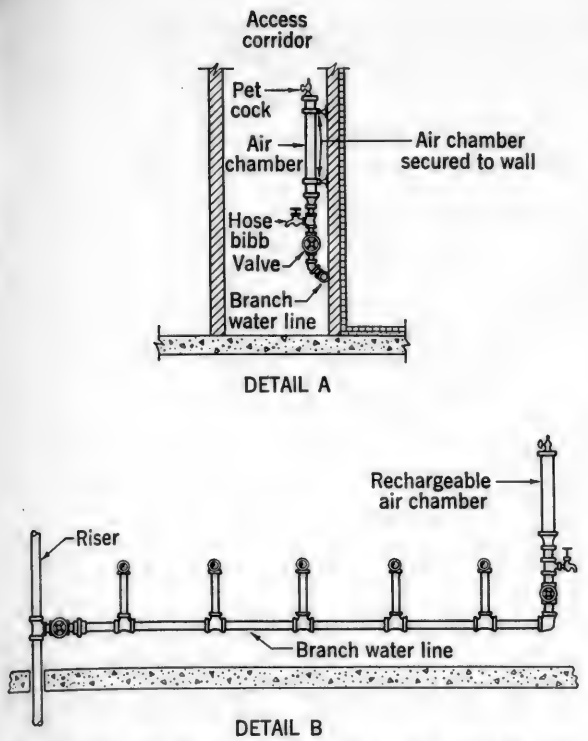


Fig. 4. How the rechargeable type of air chamber may be utilized in a water piping system.

air chamber is determined by the engineer. Usually it is between 12 in. and 24 in. long.

Detail *B* illustrates how the air chambers are installed on the branch hot and cold water lines that serve a battery of lavatories. When the piping system is first installed the chambers contain air at atmospheric pressure which compresses when the water is turned on. The chambers will function until the entrapped air becomes water logged. It usually takes but a short time for the water to absorb and displace the air in the chamber. When this happens it becomes necessary to recharge the chamber with air if it is to serve its purpose in an effective way.

Recharging is accomplished by shutting off the branch valves and opening the fixture faucets. This procedure will allow air to bubble into the supply lines and enter the pipe chamber again. Unfortunately, this method of recharging is not positive. Therefore, these air chambers, which may be regarded as an extra expenditure, will not cushion water hammer unless they are continually maintained. When you estimate the cost required to place such air chambers at each cold and hot supply to every fixture, you might find it more economical to consider other types of chambers or devices that are more positive in operation.

Rechargeable Air Chambers

A more effective means of absorbing water hammer is the device shown in Fig. 4, which comprises an air chamber equipped with a valve, hose bibb and pet cock. This device can be placed in any location on the piping system where water hammer is likely to develop. It is recharged by closing the valve, opening the pet cock and allowing the water to drain out of the hose bibb. Once filled with air at atmospheric pressure the chamber is ready to function again.

Detail *A* shows the air chamber installed in an access corridor to serve a branch water line which supplies a group of fixtures. Both the cold and hot water branches would each require one of these chambers.

Detail *B* illustrates how the air chamber could be installed on a branch water line that supplies several water closets. When this type of air chamber is installed in a space other than an access corridor, it is important that an access door be provided to permit recharging of the chamber. Since such air chambers are rather heavy devices, they should be supported so that its weight will not be imposed on the piping.

Manufactured Devices

There are on the market a number of different devices that have been developed to control water hammer. Figure 5 represents several of those devices used in large quantities.

These devices may be classified as follows:

1. Bellows type.
2. Insert type.
3. Precharged bellows type.
4. Insert type.
5. Diaphragm type.
6. Copper coils.

In addition to the devices shown in Fig. 5, there are of course, other types available. Manufactured water hammer arrestors reflect the tremendous strides made in this field. Such devices require no maintenance or recharging and therefore can be placed in any type of a concealed pipe space. Moreover, since these units offer a neat appearance, they can also be placed in exposed locations. It is both practical and economical for the engineer to consider such devices for his water hammer applications.

Advice on type, specific capacity and the recommended placement of the device can be obtained from the manufacturer of the particular unit selected.

Typical Water Piping System

Water hammer arrestors may be placed on a piping system in a number of different locations depending upon the particular design the engineer favors. One manner of placing the water hammer arrestors is shown in Fig. 6.

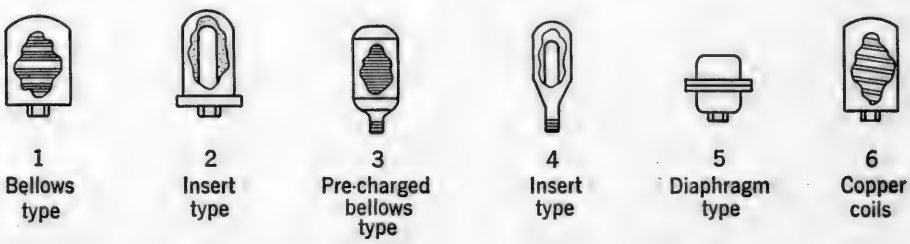


Fig. 5. Several different types of manufactured water hammer arrestors now on the market.

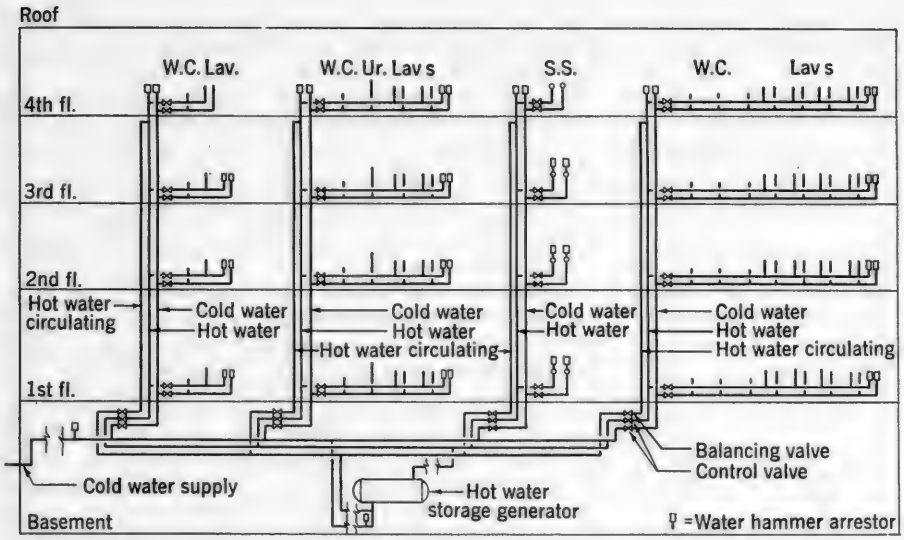


Fig. 6. Typical layout of water distribution system in an average building. This is one of several arrangements that may be followed for the location of water hammer arrestors.

The piping system shown is an upfeed system and consists of cold, hot and hot water circulation piping. The locations given for the placement of the water hammer arrestors is for the purpose of example only. Other locations can be used with equal success. You will note however, that these locations will protect the overall piping system from the damage that can result from water hammer.

Water hammer arrestors are placed on the water service into the building at the building side of the valves, meters and check valves. They are also placed at connections to various types of equipment. Water hammer arrestors are especially important at the discharge side of different types of pumping equipment to prevent damage. These devices are assurance that the water system is properly protected.

Temperature Comfort Important in Home Design

Dr. L. P. Herrington, research director, The Pierce Laboratory of Hygiene, lecturer at Yale University, nationally-known authority on physiological engineering and chairman of a U.S. Army Quartermaster Command's Committee on stress physiology, called on the nation's builders to assume leadership in climate design as the traditional "great physicians and physiological engineers of mankind." He spoke at a conference that was held at the Los Angeles, Calif. campus of the University of California. The meeting was sponsored by the university and the Institute of Heating and Air Conditioning Industries.

Evidence is mounting, he told an audience of builders, architects, engineers and contractors, that thermal conditions may have a greater effect on shortening human life than hard work, and that only home insulation may protect man from the cumulative effect of atomic radiation and other air contamination.

Dr. Herrington advised architects and builders to take a lesson from the pages of the military in designing the American or world home in the light of available physiological data which he said is demonstrating that the climatic environment exerts a profound effect on human well being and efficiency.

"When practical military men," he declared, "consider it essential to engineer a special indoor environment for even low-rank personnel in certain critical activities, it is time for those of us concerned with civil life to be on the move."

Experiments with animals indicate that different climate can produce structural and organ changes in human beings as the result of the stress of heat and cold. Military tests also indicate that unfavorable climates, uncompensated by conditioned housing, reduce human life expectancy.

Ambient temperature alone, said Dr. Herrington, has been found to have "a large effect on the precision of skilled muscular acts as well as the execution of practiced logic. Accident rate among miners bears an orderly relation to temperature. At about 60 deg F accidents were at a minimum, with an increase of two to threefold as temperatures increased to approximately 80 deg.

"Studies in British munitions factories show that both cold and heat stress increase the frequency of accidents in manual operations. Accidents were at minimum at 67 deg and increased above and below this temperature. In long periods of code reception, errors increased from an average of 12 per hour to more than 90 per hour as effective temperature was increased from 70 to 97 deg."

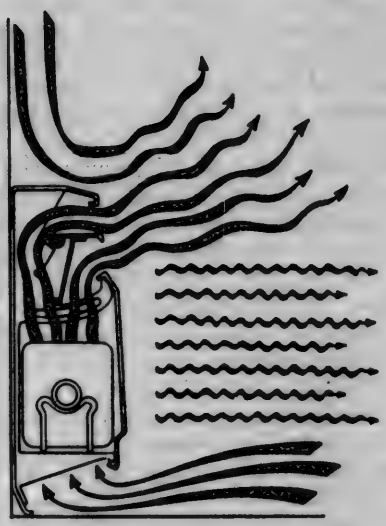
"It is a physiological sin to wear clothing at a temperature above 85 deg," Dr. Herrington observed.

Comfort factors other than average temperature must be considered by the designer and the builder, he declared. Among them are satisfactory methods of heating and cooling for special populations and work activities. Coal miners, physically active, are comfortable at 50 deg., he pointed out. Many factory operatives may find comfort at 65 deg, and lightly clothed textile workers may find that 85 deg with appropriate air movement, is a satisfactory, comfortable condition.

AIR CONDITIONING, HEATING and VENTILATING'S

REFERENCE SECTION

NOVEMBER, 1957



Residential Baseboard Radiation

A STAFF REPORT

Summary and specifications of manufacturers' equipment for residential baseboard radiation heating systems

Residential Baseboard Radiation

A STAFF REPORT

Based on a survey of leading manufacturers, this report summarizes the latest information on residential baseboard radiation. Applications of residential baseboard are presented, and a number of manufacturers' systems are described and illustrated, with pertinent specifications given in tabular form. This report will be followed up next month with a summary of commercial and industrial finned-tube radiation systems.

SINCE the end of World War II, baseboard radiation heating with hot water or steam has become popular in the residential field because it provides quiet, uniform heating where heat loss is greatest, is easy to install, and blends with any kind of architecture and interior decorating. It is equally well suited for new construction or the modernization market. As indicated in Fig. 3, 4, and 5, it may be utilized in single or double series loop installations, one or two pipe forced circulation systems, or two pipe steam systems.

Baseboard radiation provides an efficient combination of radiant and convected heat. Flexibility is demonstrated by the fact that where available outside wall surface is insufficient, as in bathrooms or kitchens, heating requirements may be met by convectors used in conjunction with the system.

Baseboard heating sections are made (a) in cast iron usually with cast integral fins and waterway or (b) in tube and fin sections with enclosures. The majority of the latter use a copper tube with aluminum fins attached by mechanical bond but they are also available in steel pipe with steel fins. Enclosures, in general, are designed to blend as inconspicuously as possible into the room in place of the usual baseboard. For average winter conditions in average installations in residential and small buildings, water temperature will usually range between 150 and 200 deg F.

Combination heating-cooling baseboards are a more recent development. A single system of piping circulates either hot or chilled water, supplied respectively by a boiler or water chiller. Filtered air is forced from a central fan system in the basement through small, flexbile tubing to baseboards where it is cooled and dehumidified, as shown in Fig. 6. Moisture that condenses on finned tubing of the baseboard from both duct air and circulating room air is drawn off by a condensate pan that runs underneath and along the entire length of the baseboard. This condensation is carried to a waste area by flexible tubing.

In this article, a number of manufacturers' residential baseboard heating systems are described and illustrated, with pertinent specifications presented in tabular form.

American-Standard Plumbing and Heating Div., New York, N. Y. (Fig. 1). Heatrim tube and fin panels have a die-formed top and back enclosure which permits the use of a wood moulding. An air vane eliminates turbulence, increases chimney effect and directs heat flow. Fins are notched to permit clearance for removal of enclosure front. Support bracket permits up to 1½ inches of free horizontal movement. Cast-iron Radiantrim panels also available have high output ratings to eliminate the need for inside wall installations.

Beacon-Morris Corp., Boston, Mass. (Fig. 2). Dampermatic 750 baseboard heating comes in 3, 4½, and 6-ft unit packages, completely assembled with panels, heating element, and splice trim pieces. Front panel, air deflector, and heating element are supported on heavy gage brackets, welded to rigid rear panel. No special fasteners, tools, or fittings are required for installation. One end of each copper tube-aluminum fin element is expanded to accept the next without a coupling. The rest of tube is carefully sized for 1-inch sweat fittings.

Brown Products Corp., Forest Hills, N. Y. (Fig. 7). Aluminum fins incorporate a facitized surface to increase

Fig. 1. Heatrim Model 75-B. American Standard Plumbing and Heating Div., New York, N. Y.

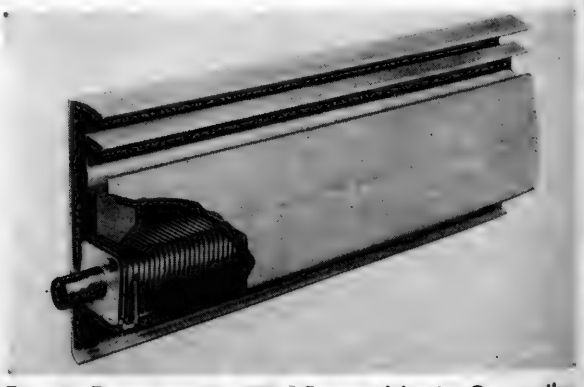
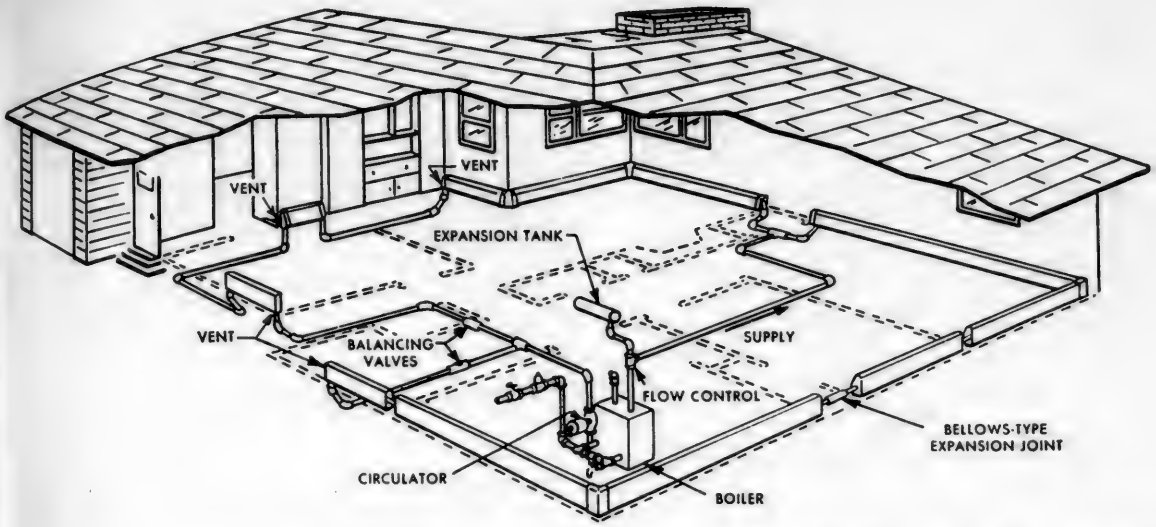
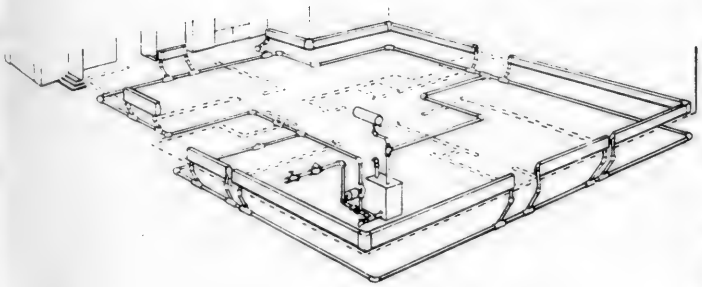


Fig. 2. Dampermatic 750. Beacon-Morris Corporation, Boston, Mass.





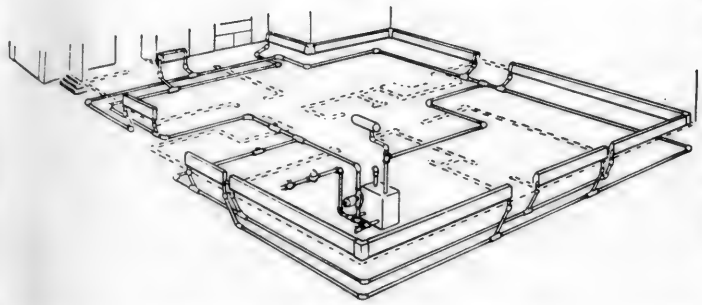


Fig. 3. (Top) Series loop forced circulation hot water systems, since basement mains can be eliminated, are particularly adapted for use in basementless homes or remodeling existing heating equipment. Lengths of baseboard are connected directly in series to carry full hot water load in each circuit.

Fig. 4. (Center) One-pipe forced hot water systems offer more convenient piping arrangements and economy of piping. Separate supply from and return to common main are used where interruptions occur due to doorways or fireplaces. More uniform water temperature in all sections of baseboard is possible.

Fig. 5. (Bottom) Two-pipe forced hot water systems having separate supply and return mains are more suited for larger homes and where more uniform distribution is desired. System permits design for smaller pipe resulting in increased velocity accompanied by faster heating-up periods. Diagrams, Fedders-Quigan Corp.

surface area on Bayce-Heet Twins designed for hot water and steam baseboard heating. The same enclosure is used for both size heating elements with brackets constructed to hold either size tube. The continuous opening at the top of the enclosure is designed to deflect heat from the walls to eliminate dirt streaks.

Burnham Corp., Irvington, N. Y. (Fig. 8). Base-Ray radiant cast iron panels for hot water and steam installations are installed with an air seal to prevent wall streaking. Aluminum foil or suitable paper is placed against the wall behind the sections, extending to the top of the units. Center supports are available in a top type which serves as a center support and as a hold-back bracket. A bottom type is screwed into a tapped lug located at the bottom of intermedaite sections.

Columbia Boiler Co., Pottstown, Pa. (Fig. 9). Aluminum in spiral strip form is bonded to the heating element on Type MF baseboard radiation. Tension fastening is provided by designing the enclosure panels so they are clamped by spring tension at top and bottom to eliminate vibrations. Pre-punched holes provide for attaching the unit to the wall and fastening brackets to insure correct location of element and enclosure cover. Damper is actuated by ball chain.

Continental Manufacturing Co., Baltimore, Md. (Fig. 10). Beautybase baseboard heating is decorator-designed for beauty and functional economy. Individual rectangular aluminum fins expand and contract noiselessly. A unique design featuring a 14-inch telescoping splice piece allows flexibility and ease of installation.

Crane Co., Chicago, Ill. (Fig. 11). Four types of baseboard radiation equipment include a cast iron type for installation along the ceiling level where baseboard space is lacking, a cast iron radiant baseboard type, a tube and fin household type and high-capacity finned tube radiation for commercial use. The tube and fin residential type has adjustable fill-in sections so that wall-to-wall installations can be made without cutting the enclosure or back panel. A special quick-action assembly tool is available for cast iron radiant sections.

Dunham-Bush, Inc., West Hartford, Conn. (Fig. 12). For residential and small commercial warm water installations Vari-Flow indoor-outdoor temperature controls are available with this baseboard heating equipment to

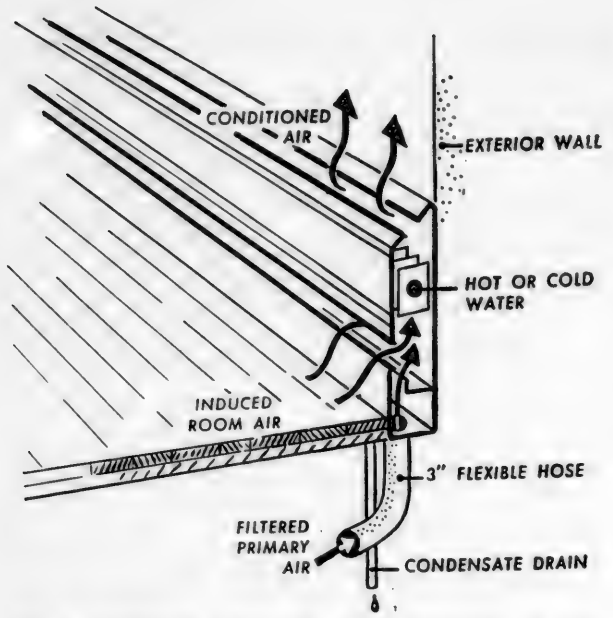


Fig. 6. Residential baseboard system designed for summer cooling and winter heating. Diagram, Better Heating-Cooling Council, New York, N. Y.

keep the heating system in balance at all times. Front panels extend to the floor. Cool air is drawn through bottom air openings and warm air passes out through top air openings. Convectors for use with the system are available. The two models produced are available in semi-recessed or flush types.

Dunkirk Radiator Corp., Dunkirk, N. Y. (Fig. 13). Blue Circle baseboard radiation is available in cast iron panels, copper tube with aluminum fins, or steel tube with steel fins. Fin and tube baseboard radiation is adaptable for loop or circuit installations to simplify applications for single or multiple housing ranging from a small home to a large apartment. Factory installed dampers are available.

Ejay Baseboard Mfg. Co., Winsted, Conn. (Fig. 14). Extrusions are made in the back plates of the Model 566 and 600 baseboard sections produced by this company, to permit brackets for holding front covers and hangers for the core, to be hooked into the extrusions, without fasteners. Dampers are available. Model No. 600 features a back and top of one piece construction. Model 566 has a grille-work design for heat outlet.

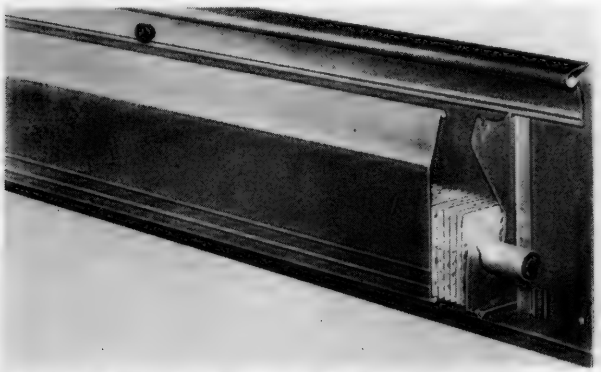


Fig. 7. Bayce-Heet Model BFT-762. Brown Products Corp., Forest Hills, N. Y.

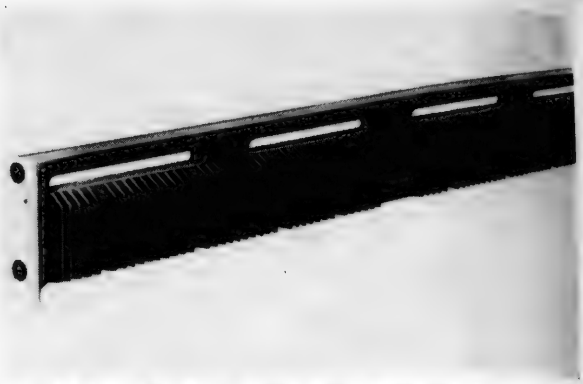


Fig. 8. Base-Ray No. 7 (rear view). Burnham Corporation, Irvington, N. Y.

Embassy Steel Products, Inc., Brooklyn, N. Y. (Fig. 15). Dampers are supplied at no extra cost with Embassy Type F baseboard. Double tier notches are pre-cut on back panels which are nailed to the wall. Back panels mount flush to the wall, at the floor line, to accommodate carpeting or asphalt tile. Brackets slide into notched grooves with front cover, end pieces, corners and joint strips snapped into place. One end of the copper tube is expanded to facilitate sweating lengths together.

Fedders-Quigan Corp., Trenton, N. J. (Fig. 16). Three types of baseboard heating are available. Beauty Base Heat Type S is similar to Type BBH except that the damper is omitted and a horizontal vane is installed. Type L has a lighter gage enclosure and fin. Both copper and steel tubes can be installed in the same enclosure except that the copper-aluminum element has wire brackets whereas, the steel element is hung with steel hangers. Accessories are die-formed and held in place with a special clip.

Federal Boiler Co., Inc., Midland Park, N. J. (Fig. 17). FBC baseboard features three piece cover assembly including one piece back cover, Neoprene-cushioned hangers which allow easy, noiseless expansion of heating element, and one piece, snap-on front cover. Heating element is spirally wrapped continuous aluminum fin, crimped at base where it engages seamless copper tubing. Crimping is said to give tight mechanical bond for maximum heat transfer.

General Automatic Products Corp., Baltimore, Md. (Fig. 18). Floor-level baseboard equipment is available with spiral or rectangular heating elements. A rubber

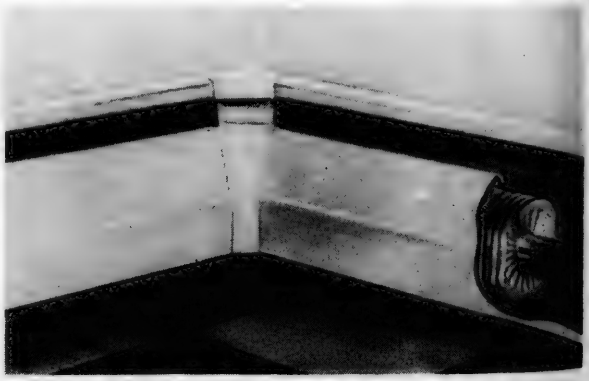


Fig. 9. Type MF Baseboard. Columbia Boiler Co., Pottstown, Pa.

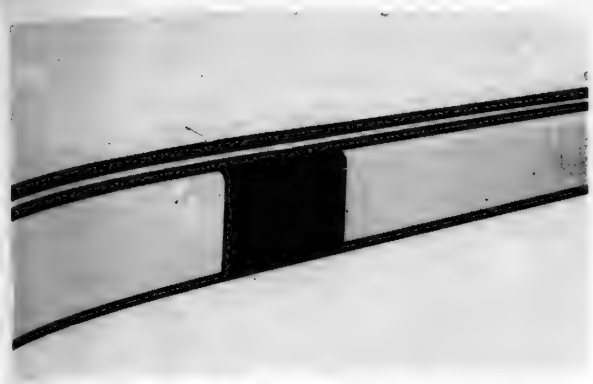


Fig. 10. Beautybase H-20. Continental Manufacturing Co., Baltimore, Md.

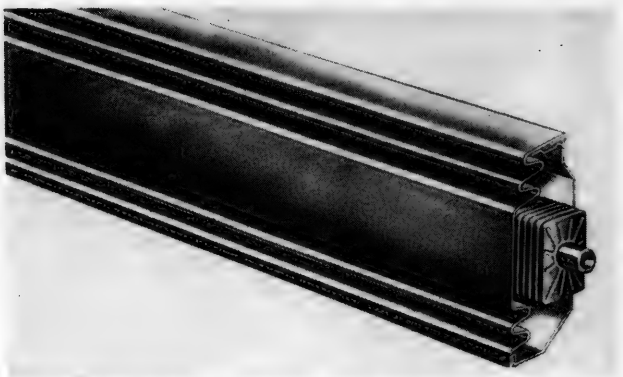


Fig. 12. Type RBE-10. Dunham-Bush, Inc., West Hartford, Conn.

grommet is installed in all openings through the floor and walls. This acts as a cushion for expansion and closes the opening around the piping. Steel panels and snap-on trim pieces are newly designed.

General Republic Heating Products Co., Philadelphia, Pa. (Fig. 19). Thrift-Master baseboard radiation consists of three components. After the back plate is fastened to the wall studs or recessed, according to the type used, the finned heating element is dropped into position on specially designed integral brackets with flexible wire supports. The supports automatically position the heating element, giving proper clearance on all sides. Finned tube elements are available with front outlet or top outlet enclosures.

Hoffman Specialty Mfg. Corp., Indianapolis, Ind. (No photo). Series A baseboard radiation utilizes seamless copper tubing and aluminum fins. Fins have tension grip collars which are mechanically bonded to the copper tubing for permanent tightness and maximum heat transfer. After element is installed, a finger tip damper is set in place on special brackets which are part of the expansion hangers. This damper forms part of the grille.

Kritzer Radiant Coils Inc., Chicago, Ill. (Fig. 20). A feature of K Line radiant baseboard is the slide cradle wrap around shoe that positions the coil vertically and horizontally to avoid rubbing of fin edges on the front or back panels and prevents noise during heating or cooling cycles. Clipped over the fins, it rides on die-formed ridges. Dampers can be added during original installation or later. Damper is held in position by punched serrations on bracket. A knob operator may be snapped anywhere along the run of the damper to provide closer and more convenient control.

National-U. S. Radiator Corp., Johnstown, Pa. (Fig. 21.) Cast-iron radiant baseboard for steam and hot water heating provides convected and radiated heat and may be installed recessed, semi-recessed or flush on any length wall. A finned surface is cast in the rear of the panels. Art baseboard of the tube and fin type have brackets spotwelded to the back of the panel. The heating element is hung on wire hooks which are hooked into the hanger brackets.

John J. Nesbitt, Inc., Philadelphia, Pa. (Fig. 22). Perimeter convectors provide a capacity of 4 sq ft of radiation per lineal foot of fin-and-tube surface. Fins have a corrugated design to provide additional heat transfer surface and increase rigidity. Supporting brackets uphold the three components of the enclosure and heating element also. Dampers attached to the support brackets operate through a bead chain and keyhole.

Radiant-Ray Radiation, Inc., Newington, Conn. (No photo). Hotline baseboard radiation is available in 1½, 3, 4, 5, 6, and 8-ft lengths. Laboratory tests of this equipment, according to the manufacturer, show very high ratings in Btu per lineal foot. (Ratings not given in table.) It is pointed out that higher Btu output has been obtained through redesigned enclosure and fin-tube proportions, supplemented by a damper vane which controls air currents. This vane, closed by a touch of the finger, can also be fastened in an open position. The baseboard is furnished in a clam-shell white prime coat.

The Rittling Corp., Buffalo, N. Y. (Fig. 23). Number 580 baseboard radiation manufactured by this company

(Text continued on page 88)

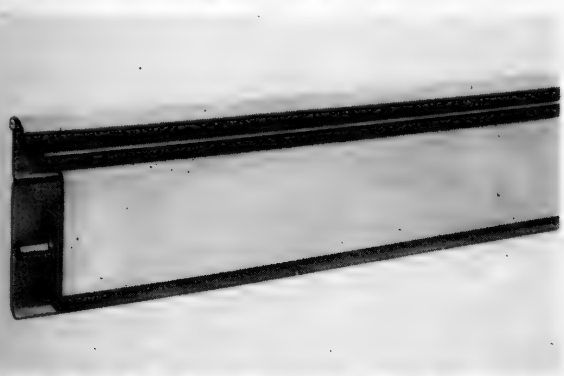


Fig. 11. Type F Radiant Baseboard. Crane Company, Chicago, Ill.

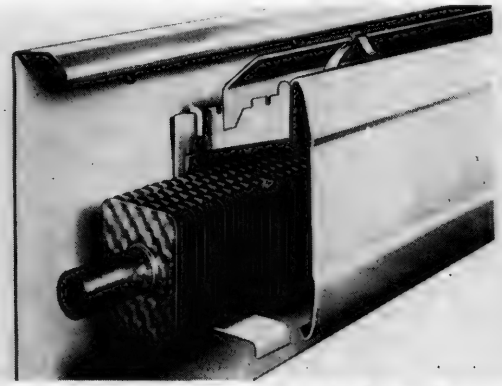


Fig. 13. Kiltie Blue Circle. Dunkirk Radiator Corporation, Dunkirk, N. Y.

TABLE I — RESIDENTIAL BASEBOARD RATINGS

Manufacturer	Model or Type	Hot Water Ratings (65 deg. F Entering Air) Avg. Water Temp. Deg. F 170	180	190	200	Steam Ratings (1 psi) Btu per Hr. per Lin. Ft.	Heating Element Material and Tube Dia., Inches	Finned Surface Material*	Size, In.	Overall Height from Floor, Inches	Nominal Length of Sections, Ft.
		Btu per Lineal Foot per Hr at 1 gpm Flow Rate									
American Standard Plumbing & Heating Div.	Heatrim Series:										
	75A, Standard	520	590	660	730	—	3/4 Copper	Alum	2 1/8x2 5/8x0.011	10 1/4	4, 6, 8
	75B, High Capacity	590	660	740	810	—	3/4 Copper	Alum	2 1/8x2 5/8x0.011	10 1/4	4, 6, 8
	100	510	580	650	720	—	1 1/8 Copper	Alum	2 1/8x3 1/2x0.032	10 1/4	6
	Radiantrim 110	490	550	620	680	815[1]	Cast Iron	C.I.	——	10 3/8	1, 1 1/2, 2
Beacon-Morris Corp.	Dampermatic 750	660	720	780	840	—	1 Copper	Alum	2 3/4x2 3/4x0.012	10 1/2	3, 4 1/2, 8
Brown, A., Products Corp.	Bayce-Heet Twins:										
	Model BFT 762	500	560	630	700	820	3/4 Copper	Alum	2x2 3/4x0.010	9	3, 4, 5, 8
	Model BFT 763	590	670	740	820	970	1 Copper	Alum	2x3 5/8x0.013	9	3, 4, 5, 8
Burnham Corp.	Base-Ray No. 7	350	390	430	480	560	Cast Iron	C.I.	——	7	——
	Base-Ray No. 9	520	590	660	720	830	Cast Iron	C.I.	——	9 7/8	1 1/2-6
Columbia Boiler Co.	MF	470	550	620	690	—	3/4 Copper	Alum	2 3/4x2 3/4x0.012	8	8
Continental Mfg. Co.	Beautybase H-20	520	590	670	740	—	3/4 Copper	Alum	2 1/4x2 1/2x0.010	9 3/4	3, 4, 5
Crane Co.	R	270	310	350	380	—	Cast Iron	None	——	9 7/8	2
	RC	470	530	600	660	—	Cast Iron	C.I.	——	9 7/8	1, 2
	F	590	660	730	800	990	3/4 Copper	Alum	2 1/2x3 1/2x0.017	9 13/16	4, 5, 6, 8
Dunham-Bush, Inc.	BE-10	543	618	702	785	930	1 IPS	Steel	2 3/4 x 4	10	1-6
	BE-10	620	706	802	898	1060	1 Copper	Alum	2 3/4 x 4	10	1-8
Dunkirk Radiator Corp.	Kiltie Blue Circle	500	570	640	700	850	3/4 Copper	Alum	2 1/4x2 1/2	8 1/2	3, 4, 5, 8
	Blue Circle	520	590	660	730	850	3/4 Copper	Alum	2x4 1/4x0.028	8	3, 4, 5, 8
	Blue Circle DRC	530	600	670	750	865[1]	Cast Iron	C.I.	——	9 7/8	1 1/2, 2
Ejay Baseboard Mfg. Co.	566	—	—	—	—	860	3/4 Copper	Alum	4 1/4x2 1/4x0.12	9 1/4	8
	600	—	—	—	—	870	3/4 Copper	Alum	4 1/2x2 1/4x0.12	9 3/4	8
Empassy Steel Products, Inc.	F	530	590	650	710	—	3/4 Copper	Alum	2 1/8x2 1/8x0.012	9 1/4	1-8
Fedders-Quigan Corp.	L	540	600	660	730	910	3/4 Copper	Alum	2 3/4x3 1/8x0.008	9 5/8	4, 6, 8
	S	590	655	715	785	930	3/4 Copper	Alum	2 3/4x3 1/8x0.020	9 5/8	4, 6, 8
	BBH	600	670	730	800	1000	3/4 Copper	Alum	2 3/4x3 1/8x0.020	9 5/8	4, 6, 8
	BBH	560	620	680	750	850	1 Steel	Steel	2 3/4x3 3/4x0.036	9 5/8	4, 6, 8
Federal Boiler Co.	FBC Baseboard	470	530	580	630	—	3/4 Copper	Alum	2 1/4x2 3/4x0.012	7 7/8	3-8
General Automatic Products Co.	Floorlevel BR	490	560	630	700	—	3/4 Copper	Alum	2 1/4x4 1/2x0.010	9	10
	Floorlevel BAS	490	560	630	700	—	3/4 Copper	Alum	2 3/8x0.010 (spiral)	9	10
General Republic Heating Products Co.	Thrift-Master PF-1000	460	510	570	630	—	3/4 Copper	Alum	2 1/8x2 1/8	9 1/2	8
	Thrift-Master PT-1000	520	590	660	720	—	3/4 Copper	Alum	2 1/8x2 1/8	9 1/2	8
	Slim-Trim Series:										
	Front Outlet	330	365	430	510	—	5/8 Copper	Alum	1 5/8x1 3/4	9 1/2	8
	Top Outlet	400	440	480	525	—	5/8 Copper	Alum	1 5/8x1 3/4	9 1/2	8
	Front Outlet	410	455	500	550	—	5/8 Copper	Alum	1 5/8x1 3/4	12	8
	Top Outlet	430	475	520	565	—	5/8 Copper	Alum	1 5/8x1 3/4	12	8
	Front Outlet—2 tiers	520	585	640	705	—	5/8 Copper	Alum	1 5/8x1 5/8	9 1/2	8
	Top Outlet—2 tiers	635	700	770	835	—	5/8 Copper	Alum	1 5/8x1 5/8	9 1/2	8
	Front Outlet—2 tiers	650	720	795	865	—	5/8 Copper	Alum	1 5/8x1 5/8	12	8
	Top Outlet—2 tiers	680	755	525	900	—	5/8 Copper	Alum	1 5/8x1 5/8	12	8
Hoffman Specialty Mfg. Corp.	Series A	495	550	615	685	—	3/4 Copper	Alum	2x3 1/4	9 3/4	6
	Series A	520	580	650	720	—	1 Copper	Alum	2x4	9 3/4	5, 6, 8
Kritzer Radiant Coils, Inc.	K line K-1	410	460	520	580	745	3/4 Copper	Alum	1 7/8x4 1/4x0.020	9 1/4	
	K line K-1	455	515	585	645	840	3/4 Copper	Alum	1 7/8x4 1/4x0.020	9 1/4	To
	K line KU-1	455	515	580	640	815	1 IPS	Steel	2 5/8x3 3/4x0.024	9 1/4	Specification
	K line KU-1	500	570	645	710	910	1 Copper	Alum	2 5/8x3 3/4x0.020	9 1/4	to
	K line KU-1	510	575	650	720	935	1 IPS	Steel	2 5/8x3 3/4x0.024	9 1/4	12 Ft.
	K line KS-1—2 rows	495	565	635	700	—	1/2 Copper	Alum	1 7/8x5 1/2x0.016	10 1/2	
	K line KS-1—2 rows	555	630	710	780	—	1/2 Copper	Alum	1 7/8x5 1/2x0.016	10 1/2	

(Table continued on next page)

TABLE I (CONTINUED) — RESIDENTIAL BASEBOARD RATINGS

Manufacturer	Model or Type	Hot Water Ratings (65 deg. F Entering Air) Avg. Water Temp. Deg. F 170	180	190	200	Steam Ratings (1 psi) Btu per Hr. per Lin. Ft.	Heating Element Material and Tube Dia., Inches	Finned Surface Material*	Size, In.	Overall Height from Floor, Inches	Nominal Length of Sections, Ft.
		Btu per Lineal Foot per Hr at 1 gpm Flow Rate									
National-U. S. Radiator Corp.	Art Baseboard:										
	BF + BR — Std. Cap.	410	460	510	560	—	3/4 Copper	Alum	2 1/8x3 1/8x0.032	9[2]	8
	BF + BR — High Cap.	480	550	620	690	—	3/4 Copper	Alum	2 1/8x3 1/8x0.032	9[2]	8
	Cast Iron Radiant I	480	550	620	690	810	Cast Iron	C.I.	——	10 3/8	1 1/2-6
Nesbitt, John J., Inc.	Baseboard Radiation	590	660	730	800	990	3/4 Copper	Alum	2 1/2x3 1/2x0.017	9 1/2	4, 6, 8
Radiant-Ray Radiation, Inc.	Hotline	——	——	——	——	——	——	——	——	——	1 1/2-8
The Rittling Corp.	580	510	580	650	720	—	7/8 Copper	Steel	2x3x0.017	10 1/4	8
Romac Industries	Suntemp RI	570	620	680	730	—	3/4 Copper	Alum	2x2 3/4x0.016	9 1/4	8
Sarco Company, Inc.	Sarcofin	510	580	640	710	850	1 Copper	Alum	2x4 1/4x0.028	8 3/4	3, 4, 5, 8
	Sarco-Pak	500	570	640	700	850	3/4 Copper	Alum	2 1/4x2 1/2	8 1/2	3, 4, 5, 8
Schemenauer Mfg. Corp.	Deluxe Baseboard	565	640	720	795	—	1 Copper	Alum	2x4	9 3/4	5, 6, 8
Shaw-Perkins Mfg. Co.	Shaw Panel Baseboard	960[3]	1100[3]	1230[3]	1360[3]	1600[3]	1 Copper	Steel	Approx. 8x3x 0.022	8	2 Inches
Slant-Fin Radiator Corp.	BB 4	520	590	670	750	—	3/4 Copper	Alum	2 3/4x2 1/8x0.011	7 7/8	4, 5, 6, 8
	BB 2	560	630	700	780	—	1 Copper	Steel	2 3/4x3 1/8x0.020	8 1/2, 10 7/8	4, 5, 6, 8
	BB 3	585	660	750	830	960[1]	1 1/4 IPS	Steel	3 11/16x4 1/4x0.035	8 1/2, 10 7/8	2-12
	BB 1	620	700	780	860	—	1 Copper	Alum	2 3/4x3 1/8x0.020	8 1/2, 10 7/8	4, 5, 6, 8
Spartan Convector Co. Inc.	Spartan Baseboard	554	620	677	750	890[1]	3/4 Copper	Alum	2 1/8x2 1/8x0.017	9	4, 6, 8
Spi-Rol-Fin Corp.	Super-Fin	470	550	610	690	—	3/4 Copper	Alum	2 3/8x2 3/4	8	8
Stedco Products	Hi Therm	540	600	670	740	900	1 1/4 Steel	Steel	2 3/4x3 3/4x0.036	9 1/2	4, 5, 6
	Hi Therm	620	690	780	860	1040	1 Copper	Alum	2 3/4x3 3/4x0.028	9 1/2	4, 5, 6
The Trane Co.	B-8	452	505	565	605	—	3/4 Copper	Alum	2 1/8x2 1/2x0.011	8 1/4	3, 4, 6, 8
	B-12	561	623	697	750	—	3/4 Copper	Alum	2 1/8x2 1/2x0.011	12	10
Tuttle & Bailey, Inc.	BF and BR (recessed)	620	700	790	880	1050	1 Copper	Alum	2 3/4x2 3/4x0.031	10	5, 6
Utica Radiator Corp.	Radiant Baseboard Panels	530	600	679	750	865[1]	Cast Iron	C.I.	——	10 13/16, 11 9/16	1 1/2, 2
The Vulcan Radiator Co.	Trimline 31	440	490	550	610	730	1 IPS	Steel	2x4 1/4	9 1/4	
	Trimline 31	500	560	630	690	830	3/4 Copper	Alum	2x4 1/4	9 1/4	Up to
	Trimline 64	550	620	690	770	920	1 IPS	Steel	2 3/4x3 3/4	9 1/4	12 Ft. in
	Trimline 64	610	690	770	850	1020	1 Copper	Alum	2 3/4x3 3/4	9 1/4	One-Inch
	Trimline 97	620	700	780	860	1030	1 1/4 IPS	Steel	2 3/4x5	12 1/4	Increments
	Trimline 97	710	800	900	990	1190	1 1/4 Copper	Alum	2 3/4x5	12 1/4	
Warren Webster & Co.	Tru-Perimeter HS	410	470	530	590	—	3/4 Copper	Alum	2 3/4x4x0.020	8 3/4	1-6
	Tru-Perimeter HC	640	730	820	900	1100	1 Copper	Alum	2 1/8x2 1/2x0.011	11 15/16	3, 4, 6, 8
Weil-McLain Co.	Snug No. 7	350	390	440	480	575[1]	Cast Iron	C.I.	——	7 1/4	1 1/2-6
	Snug No. 9	510	570	640	700	805[1]	Cast Iron	C.I.	——	9 3/4	1-6
Young Radiator Co.	Perimaheat	560	642	726	807	949	7/8 Copper	Alum	2 5/8x2 5/8x0.013	9 3/4	6, 8

* C.I. refers to cast iron; Alum refers to aluminum.

[1] Converted from company's value for steam rating at 1 psi in square feet per lineal foot.

[2] Models BR are recessed. Their overall height from floor is 8 27/32 inches.

[3] Hot water and steam ratings are calculated from data in company's bulletin.

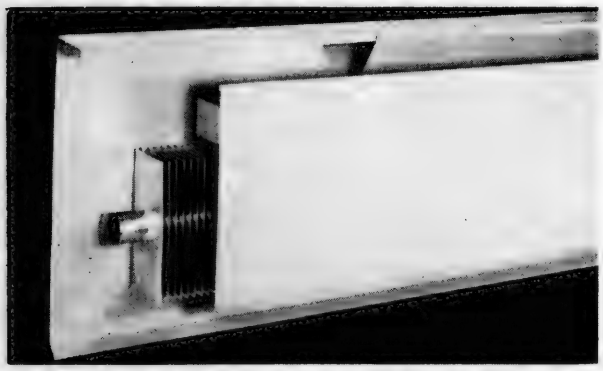


Fig. 14. Model 600. Ejay Baseboard Manufacturing Co., Winsted, Conn.

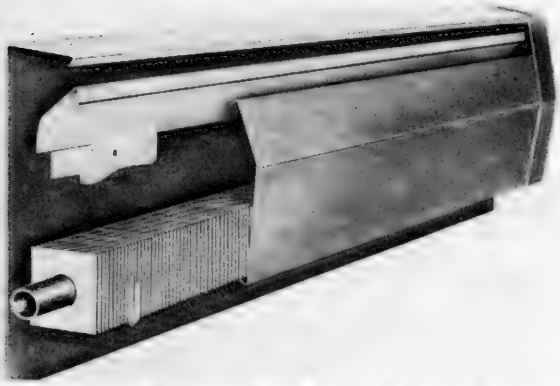


Fig. 15. Type F. Embassy Steel Products, Inc., Brooklyn, N. Y.

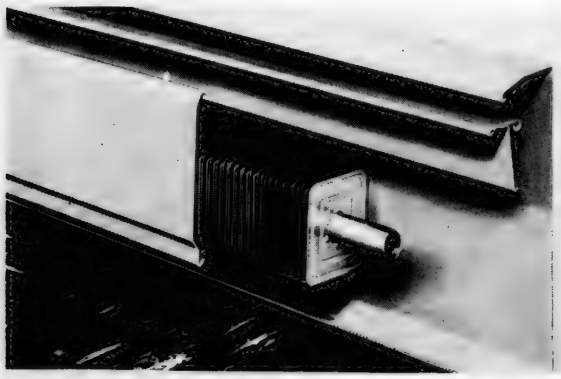


Fig. 16. Model BBH. Fedders-Quigan Corp., Trenton, N. J.

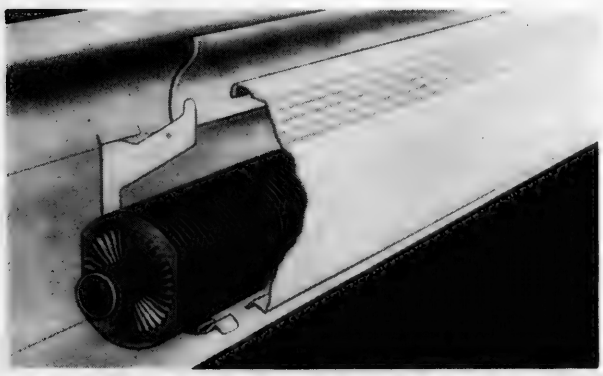


Fig. 17. Type FBC Baseboard. Federal Boiler Co., Midland Park, N. J.

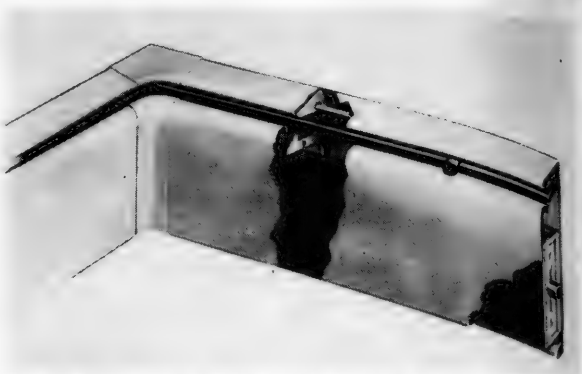


Fig. 18. Floorlevel Baseboard. General Automatic Products Corp., Baltimore, Md.

is a new line featuring single unit design for all-purpose installation including free standing, semi or fully recessed. The enclosure is designed to insure maximum stacking effect. An adjustable deflector-damper is standard. Die-formed brackets support the heating element and front panel and reinforce back and top. Brackets are notched to support a concealed bypass or return line when it is desired to bring inlet and outlet connections out at one end.

Romac Industries, Camden, N. J. (No photo). Suntemp RI baseboard radiation features a combined back and top panel in one-piece construction, permitting the same unit to be equally adaptable for either flush or recessed installation. A louver blade controls flow of warm air to provide for maximum comfort and to prevent wall streaking. Slot-positioned support brackets hold in place the heating element, louver blade, optional damper, and front panel. Except for back panel to wall screw connections, no other fasteners are required for complete installation.

Sarco Company, Inc., New York, N. Y. (Fig. 24). Silent-Glide hangers are designed to prevent contact between the element and cover. Bracket is coated with a plastic which is unaffected by temperatures up to 350 deg. Combination vane-damper on Sarco-Pak is held in place with wire spring clips and comes as an integral part.

Schemenauer Mfg. Corp., Holland, Ohio. (No photo) DeLuxe baseboard radiation features full back panel with extending top deflection lip and rigid floor flange which can be used for installations where radiation is recessed

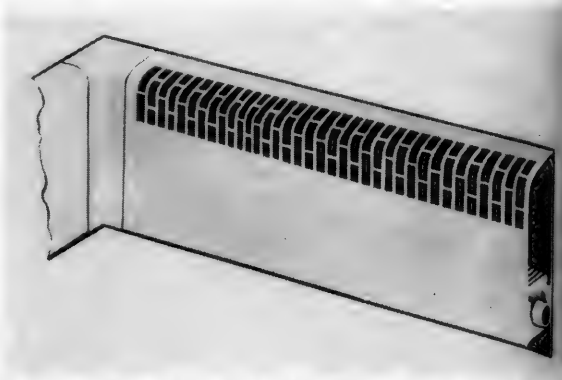


Fig. 19. Thrift-Master Model PT-1000. General Republic Heating Products Co., Philadelphia, Pa.

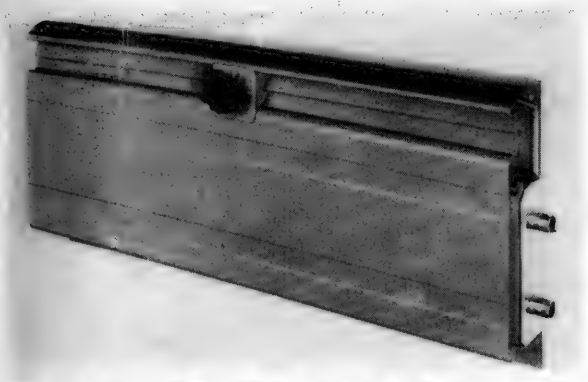


Fig. 20. K Line-2 Tier. Kritzer Radiant Coils, Inc., Chicago, Ill.

or installed on finished plaster. A damper offers complete, fingertip control of heating as well as serving as part of the grille. The serrated surface of the aluminum fins is designed for the maximum in heating efficiency.

Shaw-Perkins Mfg. Co., Pittsburgh, Pa. (Fig. 25). Widely spaced, full length steel heating plates mechanically bonded to twin copper tubes is a feature of the Shaw Panel baseboard radiator. The front panel is made up of 2-in. wide stamped steel sections. One center section panel joins any combination of basic units. Three basic radiation types are offered to meet all tapping arrangements. Two types of special end fittings are provided for connection to one-pipe, two-pipe or perimeter hot water systems and vapor or vacuum steam systems.

Slant-Fin Radiator Corp., Richmond Hill, N. Y. (Fig. 26). Baseboard radiation heating elements are available in three types with copper tube and aluminum fins, copper tube and steel fins, or steel pipe with steel fins. Fins are slanted on some models and feature interlocking fin and flange construction, with fins joined at the outside edges and at the flange. Closed outer fin edges are said to create a flue action. Track expansion clip prevents metal-to-metal contact.

Spartan Convector Co., Inc., Maspeth, N. Y. (Fig. 27). Modulating heat control is provided with the damper adjusted by roller pressure to any position from fully open to closed. Aluminum fins are corrugated. A series of annular rings embossed on the inside of the copper tube creates turbulence at low water flow. Heating element rests on saddles of vinyl plastic to allow for quiet expansion and contraction. Brackets are designed to

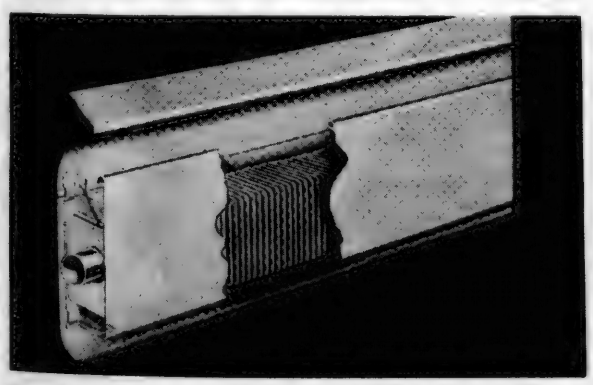


Fig. 21. Art Baseboard. National-U.S. Radiator Corp., Johnstown, Pa.

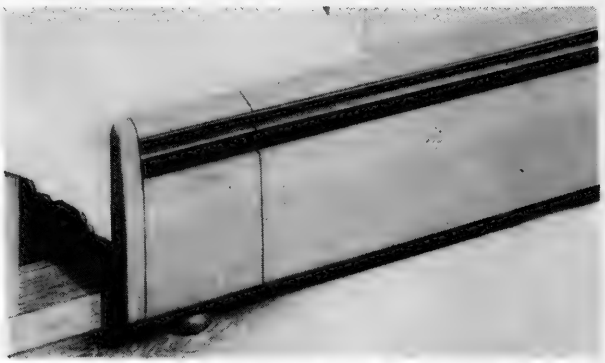


Fig. 22. John J. Nesbitt, Inc., Philadelphia, Pa.

Fig. 23. Model 580. The Rittling Corp., Buffalo, N. Y.

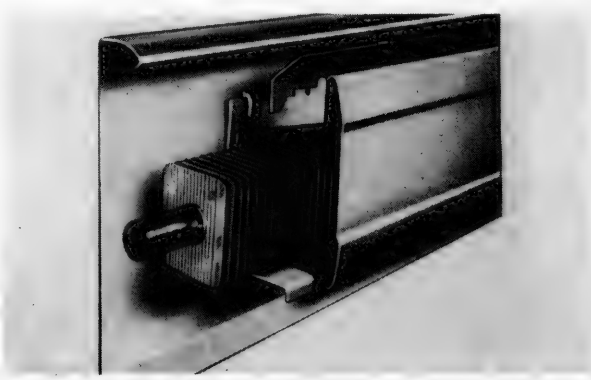


Fig. 24. Sarco-Pak. Sarco Company, Inc., New York, N. Y.

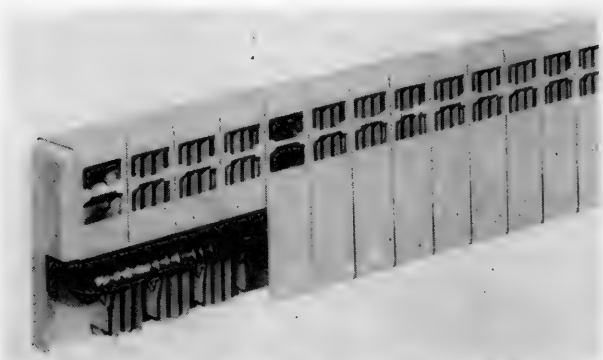


Fig. 25. Shaw Panel Baseboard. Shaw-Perkins Manufacturing Co., Pittsburgh, Pa.

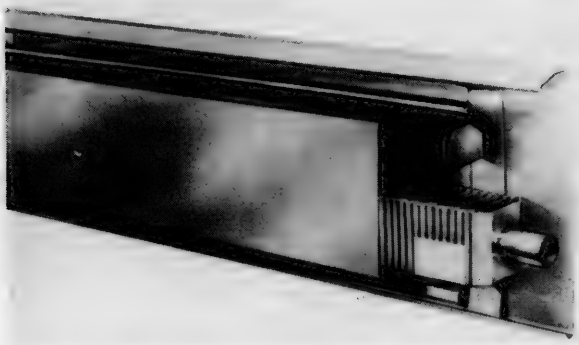


Fig. 26. Slant-Fin Baseboard. Slant-Fin Radiator Corp., Richmond Hill, N. Y.

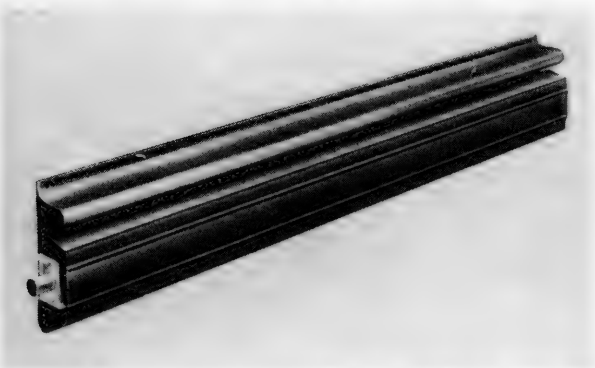


Fig. 27. Spartan Convector Co., Inc., Maspeth, N. Y.

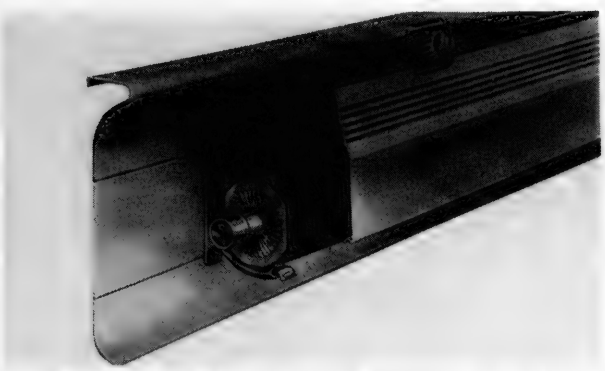


Fig. 28. Spi-Rol-Fin Corp., Pequannock, N. J.

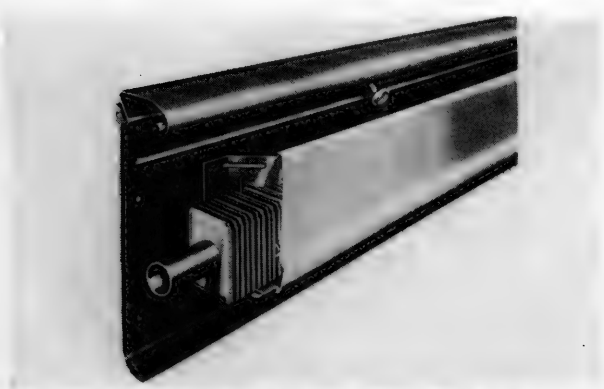


Fig. 29. Trane Baseboard Convector. The Trane Company, La Crosse, Wis.

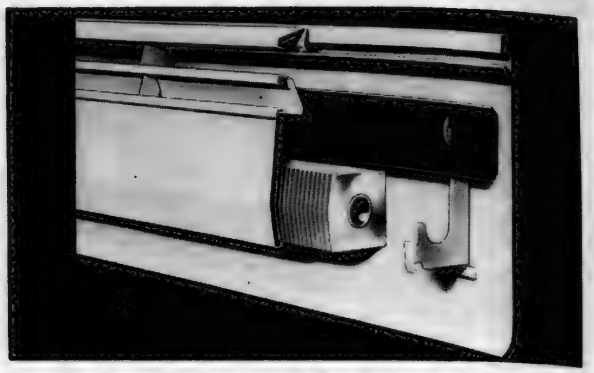


Fig. 30. Type BF Baseboard Panel. Tuttle & Bailey, Inc., New Britain, Conn.

stiffen the cabinet to prevent distortion. Cam at bottom of mounting bracket insures positive locking of removable front panel.

Spi-Rol-Fin Corp., Pequannock, N. J. (Fig. 28). Cover assemblies are available in a great number of lengths to facilitate installation without cutting on the job. Element hangers are factory installed and are designed so that the element is free to move while making up connections and during contraction and expansion. They are covered with a neoprene saddle. Cover assemblies are finished in white enamel and are also finished in chrome and coppertone finishes. Aluminum fins are continuous, spirally-wrapped.

Stedco Products, Wilkes-Barre, Pa. (No photo). Hitherm baseboard radiation is available for flush or recessed installation, extending 2¼ or 3 inches into the room. Double sliding cradle hangers permit horizontal expansion. Radiation enclosure is furnished with fingertip damper control. The same baseboard is used for flush and recessed installation. Furnished in a gray zinc coat finish, the enclosure may be painted to blend with room decoration.

The Trane Co., La Crosse, Wis. (Fig. 29). Fin collars of Trane baseboard convectors are formed to create a second tube to provide increased heat output. The back panel has a groove at the top into which a rubber gasket fits to make a permanent seal between the unit and wall. A free-swinging hanger allows the heating element to move within the cabinet. The hot water control valve is hidden. Dampers for individual room control can be snapped in during installation or afterward. An Air Reducer is designed to remove air from the system at

Fig. 31. Radiant Baseboard Panels. Utica Radiator Corporation, Utica, N. Y.

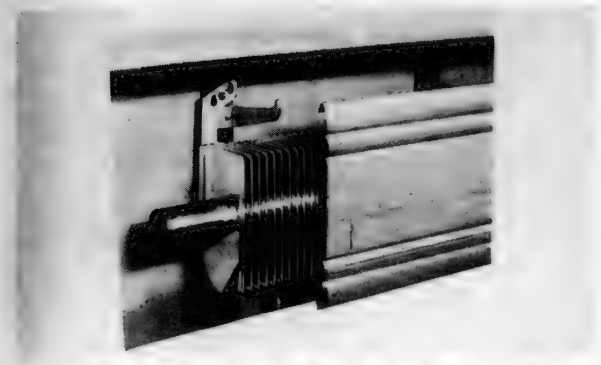


Fig. 32. Trimline Baseboard. The Vulcan Radiator Corporation, Hartford, Conn.

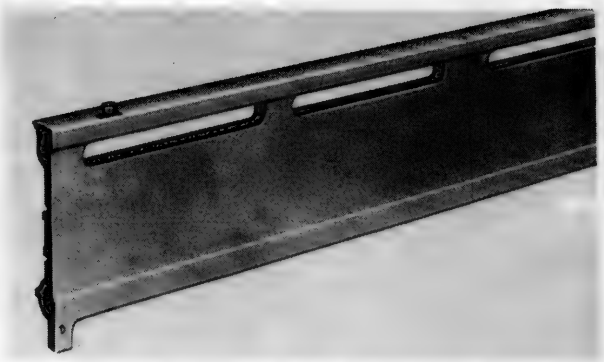


Fig. 34. Snug Baseboard Panel. Weil-McLain Co., Michigan City, Ind.

the boiler. Models can be installed free standing or recessed.

Tuttle & Bailey Inc., New Britain, Conn. (Fig. 30). Aluminum fins have a beveled front edge to provide maximum fin-to-air heat transfer. Heating elements are held in place with hanger brackets held in slots which permit movement of the bracket to allow for expansion. The recessed model is designed for new installations and the free standing type is recommended for remodeling work. Convectors are available for both types. Damper is installed by placing over extension lugs on the hanger brackets.

Utica Radiator Corp., Utica, N. Y. (Fig. 31). High output per lineal foot is a feature of Utica cast-iron baseboard panels. Heating requirements can usually be satisfied by placing the panels on a single outside wall without continuing the installation around the corner of the room. Panels can be wall mounted or supported on base brackets. Assemblies can be furnished up to 9 ft in length.

The Vulcan Radiator Co., Hartford, Conn. (Fig. 32). Offset fins mechanically imbedded in copper or steel water tube are a feature of the Trimline Radi-Vector baseboard heating equipment. Two types of damper operating controls are available. One type is mounted on a front joining piece and carries the operating knob and cam. The second type is used on custom fabricated installations where covers are furnished cut to exact lengths. The damper control is a separate unit which is made to mount on the upper lip of the front panel. Damper will remain in any desired position.

Warren Webster & Co., Camden, N. J. (Fig. 33). The damper on Tru-Perimeter forced hot water baseboard heating is formed from a magnesium extrusion and fits into a cut-out in the enclosure front. A by-pass valve is available to provide a greater reduction of heat flow. The valve directs flow of water through a tube above the heating element. Continuous flow control with an outdoor thermostat is available as an optional feature. Convector type units are available for use with this system in rooms where additional heat is required or perimeter space is lacking.

Weil-McLain Co., Michigan City, Ind. (Fig. 34). Large waterways are designed to provide live front heating and a reservoir of stored heat to prevent a sharp drop in temperature when the thermostat shuts off, on Snug baseboard radiant cast iron panels. The finned rear surface provides convected heat. Air vents are located in the top of the baseboard. Legs on end sections automatically position baseboard against wall. Center legs may be inserted where needed. Sections are designed for installation under very low windows.

Young Radiator Co., Racine, Wis. (Fig. 35). Perimaheat baseboard panels feature a bracket for the front cover and heating element that is designed to support and facilitate the installation of a bypass or return tube within the cabinet. A damper which is optional is held in place by retainers snapped into the top groove.

The back and top of these units is of one-piece construction. Cabinet is suitable for surface mounting or partially recessed installation. The front cover which is snapped into place is designed to be removable for access. Heating element fin collars and tube form a double-walled continuous metal transfer surface.

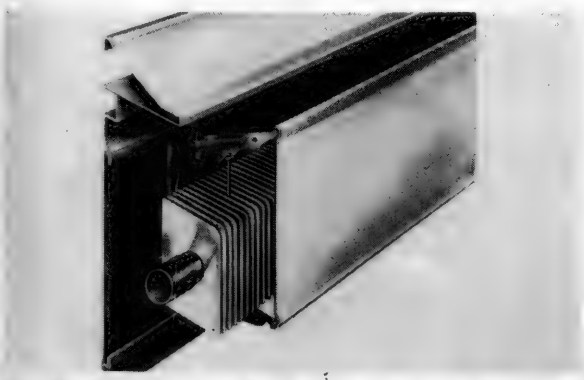


Fig. 33. Tru-Perimeter Baseboard. Warren Webster & Company, Camden, N. J.

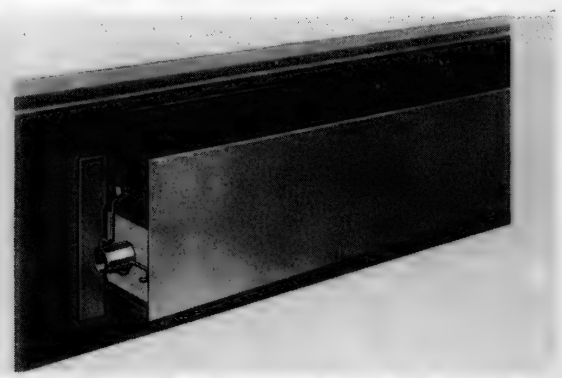
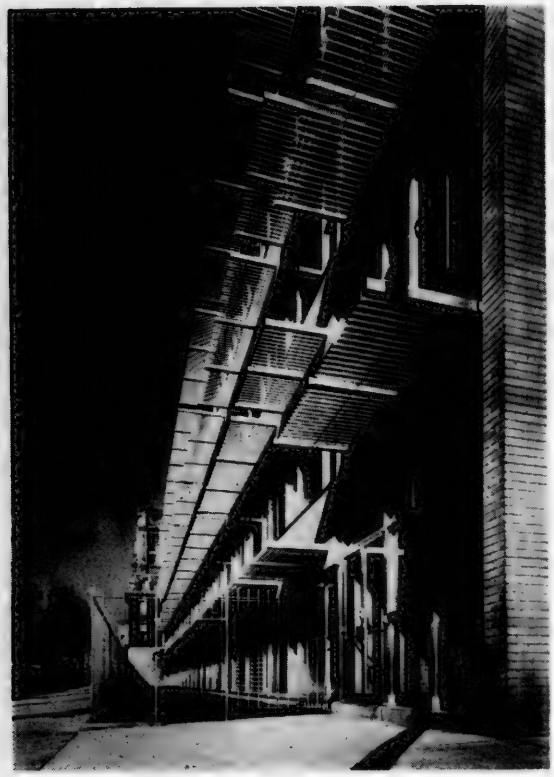


Fig. 35. Perimaheat Baseboard. Young Radiator Company, Racine, Wis.

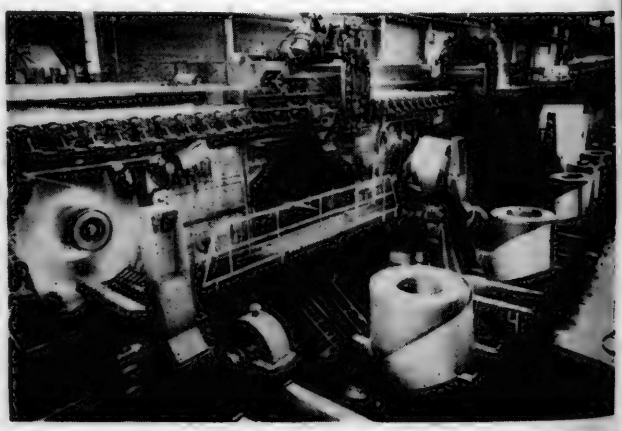


SUN CONTROL FOR MODERN ARCHITECTURE. (Left) An interesting application of standard panels of grating provides a new method of sun control for modern architecture. Irving Subway Grating Co., Inc., Long Island City, N. Y., has made available grating panels for use as sunshades on school buildings and other structures which require large glass areas for natural lighting. In addition to control of glare from direct sunlight, grating panels can substantially reduce cooling costs of air conditioned buildings, and are strong enough to be used as window-cleaning walkways. Photo shows sunshades made of aluminum grating on Curtis Hall, Temple University, Philadelphia, Pa.

DEPARTMENT OF SKINNED CATS. (Below) When cranes were unavailable to lift a 1000-lb exhaust blower 100 ft to the roof of Hotel Monica in time for the Santa Monica hotel's opening deadline, a rented helicopter, with permission from Civil Aeronautics Authority, did the hoisting job in a few minutes. Photo, courtesy of Smallcomb Electric Co., Master Fan distributor of Los Angeles, Calif.

Picture Paragraphs

SHEET METAL DUCT IN THE MAKING. Early stages in the production of sheet metal for heating and air conditioning ductwork are shown in photos below. At left, these six finishing mills in the Strip Steel Department at Weirton Steel Co., Div. of National Steel Corp., have a capacity of 2,640,000 tons of hot strip per year. The strip leaving the last mill may travel as fast as 2400 fpm. in right-hand photo, the downcoiler at left is coiling hot steel strip as it comes from the last mill. Coils are removed from downcoiler and allowed to cool on continuous conveyor before being moved to succeeding operations, which for galvanized steel include cold reduction, cleaning, annealing, and continuous galvanizing.



Good installation and maintenance practices for

Centrifugal Fans and Unit Fans

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What should be done to prevent fan trouble and what to do if trouble does develop, are described. While this article does not give minute details of installation and maintenance, it does attempt to present over-all principles. If these are applied with sound judgment and conscientious attention to detail, the author believes that long uninterrupted service at low operating cost will result.

THE fan is an often neglected, though extremely important, part of any air conditioning or ventilating system. If the fan is not doing its job properly in a built-up system or a central station cabinet unit, desired conditions cannot be maintained. Unless fans are properly installed and maintained, they will not give the service intended.

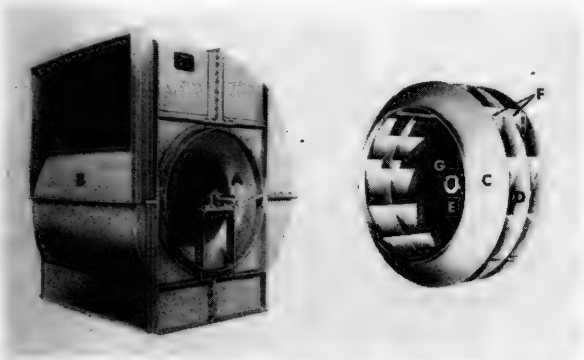


Fig. 1. Typical backwardly inclined DWDI arrangement No. 3 Class II centrifugal fan and SWSI Class II wheel.

Good fan installation plus preventative maintenance measures will insure that the user will receive the service paid for when the fan was installed.

Before getting into principles and installation practices, let us review the equipment itself.

Figure 1, which shows a typical backwardly inclined DWDI, Arrangement No. 3 Class II centrifugal fan, is a familiar sight in manufacturing plants. These fans come in many sizes, from ones the size of a television set to large ones about as big as a double car garage.

The fan of Fig. 1 has an 89 in. wheel and measures 14 ft wide, 13 ft deep, and 14 ft high. Examining the fan, *A* is the inlet cone which is streamlined to permit efficient air flow into the fan, *B* is referred to as the cut-off. The parts of the wheel are the rim *C*, the intermediate ring *D*, hub plate *E*, the blades *F*, and the hub *G*.

Some of the accessories commonly used on fans are discharge dampers and inlet vanes used to control air volume. Inlet screens are used to prevent foreign objects from entering the fan and to protect personnel who pass near the fan inlet. Access doors are frequently provided to simplify cleaning and repainting. Rotating cooling shields cool bearings when the fan is handling high temperature air.

Cabinet Unit Fans

Another common type of fan is found in central station cabinet type air conditioning units. The unit shown in Fig. 2 is typical of the air conditioning, heating and ventilating units found in factories, stores and office buildings. Units such as these are manufactured in various sizes, with one, two or three-fan wheels on a common shaft and are equipped with a variety of accessories.

The important parts of the air conditioning unit are the fans, the humidifiers, the cooling and/or heating coils, the filters, the mixing dampers, the drain pan, and the motor and drive. We are primarily concerned with the air handling end of the unit covering the fans, humidifiers and dampers.

What Can Be Expected from a Fan?

For our purpose, fans in built-up systems and factory assembled cabinets can be treated in a similar manner. From now on all points mentioned will apply to both types. The first question is, what can we expect from a fan?

A fan should be able to:

1. Deliver the volume of air specified.
2. Operate efficiently.
3. Perform without abnormal vibration.
4. Continue to do its job without shut-down except for planned maintenance.

To achieve this performance,

1. The fan must be of quality construction.
2. It should be properly installed.

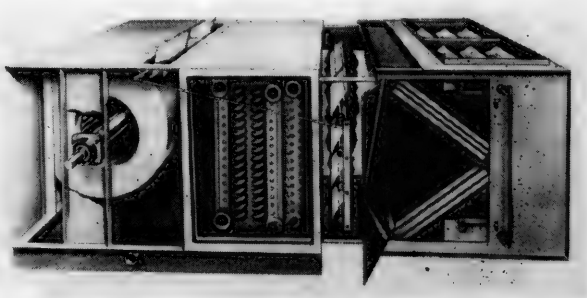


Fig. 2. Typical central station cabinet type air conditioning unit.

3. It should be cared for through a planned maintenance program.

To insure quality construction, insist that a fan be the product of a reliable manufacturer. Quality can not be judged entirely on the basis of materials used.

How the fans and units are installed is also important. By employing an experienced contractor, you can reasonably be sure that the equipment will be installed to do the job for which it is intended.

The maintenance of an installation, once it has been checked out by the contractor, is up to plant maintenance personnel. Handled in accordance with a planned schedule, long years of service can be expected.

Fan Testing and Rating

Fan manufacturers have been working together for years in the National Association of Fan Manufacturers, now a division of Air Moving and Conditioning Association, to establish testing laboratory standards and test personnel requirements so that accurate ratings may be made available to those who specify and purchase fans. Many fans now carry a Certified Rating Seal, indicating that they have been tested and rated in accordance with the code adopted jointly by ASHAE and NAFM. The certification further indicates that manufacturing tolerances are maintained so the fans will develop full catalog ratings. This seal is used only on indiivdual fans, not on fans in units.

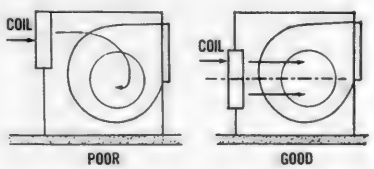


Fig. 3. Both coils and inlet ducts should be located so that their centerlines coincide with the fan centerline.

Field Installations

The ideal conditions under which fans are tested are rarely encountered in field installations. Lack of space, or equipment rooms of improper shape often require a wide deviation from the ideal. Cramped quarters at the inlet can seriously affect fan capacity. Discharge conditions requiring sharp turns or duct splitters near the fan discharge can result in capacity reduction and in noisy operation, if not properly handled.

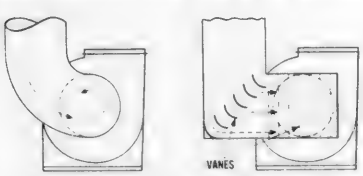


Fig. 4. Compound curve on fan inlet duct, left, causes spin. Vanes in elbow and at fan inlet eliminate spin.

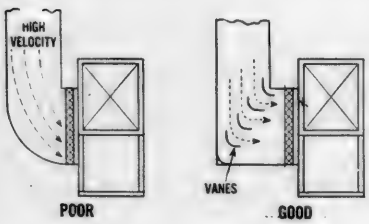


Fig. 5. Uniform inlet distribution, through proper use of vanes, improves fan operation and reduces noise.

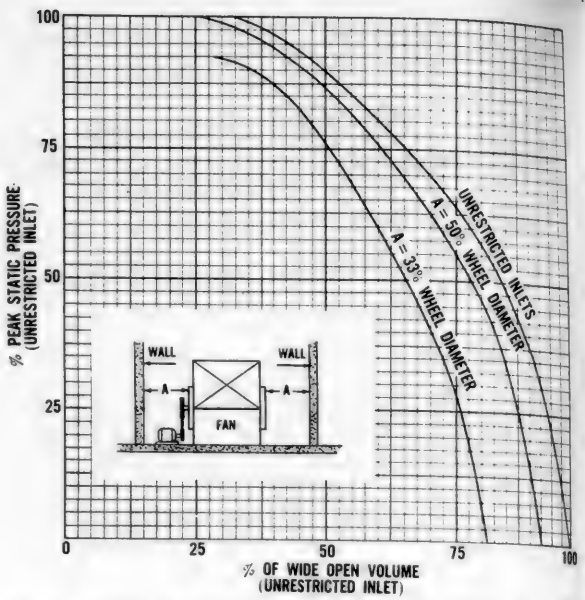


Fig. 6. Space restriction reduces fan capacity as indicated by these curves from tests on double inlet fan.

Effect of Inlet Conditions on Capacity

The following conditions at the inlet to the fan can reduce capacity:

1. Spinning air stream.
2. Non-uniform air distribution.
3. Insufficient space between fans or from the fan inlet to the wall.

Spin. Probably the item that puzzles most investigators of fan capacity loss is the effect of a spinning air stream as it enters the fan. How does this spin affect capacity? If the spin is in the direction of wheel rotation, capacity will be reduced and the power consumption will drop. If the spin is counter to wheel rotation, power consumption will increase and the fan will operate with noticeably more noise.

Spins can be caused by coil location or duct design. Both coils and inlet ducts should be located so that their centerlines coincide with the fan centerline as shown in Fig. 3.

Spin can also be caused by inlet duct design as illustrated in Fig. 4. This shows a compound curve at the fan inlet. This type of duct connection will cause the air to spin as it enters the fan wheel. By using vanes as shown in this figure, both in the elbow from the vertical to the horizontal and at the fan inlet, the spin can be eliminated.

Non-Uniform Distribution. Improper distribution of air into a fan inlet would cause trouble. The fan cannot possibly operate as effectively and as quietly if most of the air is being forced into only a portion of the inlet opening. This can be eliminated through the proper use of vanes as seen in Fig. 5.

Space. When there are no inlet ducts, a fan capacity is affected when the space between fans in a multiple-fan installation or the space between the fan inlet and the wall is too small. The curves in Fig. 6 show the effect of such space restriction on fan performance. General practice is to locate multiple fans at least one fan diameter

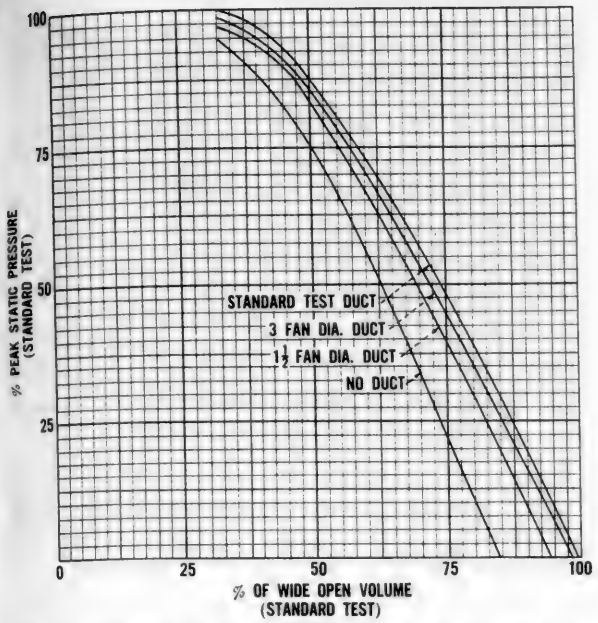


Fig. 7. Length of discharge duct affects fan performance. Duct extension from fan should be straight, same size, for 1.5 fan diameters.

apart, and not to place a fan inlet closer than one-half fan diameter from the nearest obstruction. Even these minimums result in decreased capacity. Greater distances should be used if at all possible.

Effect of Discharge Conditions on Fan Capacity

Ideal discharge conditions used during fan tests, with the discharge unchanged in size or direction for 7½ fan diameters from the discharge, are seldom possible. However, the discharge duct should be extended unchanged in size or direction as far as possible.

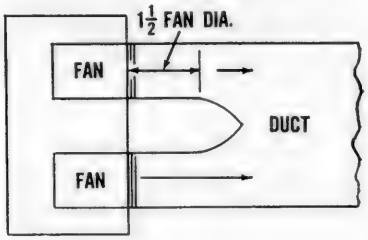


Fig. 8. "Pair of pants" is current duct design at outlet for multiple fans.

Air velocity as it leaves the fan discharge is not uniform. This variation in velocity is somewhat greater in forward curved fans than it is on non-overloading fans. For full capacity, the duct must be extended until the velocity is fairly uniform over the entire duct cross section. In a distance equal to 7½ fan wheel diameters from the discharge, the air velocity will be fairly uniform.

The correct duct extension accomplishes two things. It results in good conversion from velocity pressure to static pressure and permits the use of standard pressure loss data in estimating duct friction. With non-uniform velocities, the data would not provide the correct figures.

The 7½ fan diameter duct is seldom used, but that is not too serious. The curves shown in Fig. 7 illustrate the result of tests on a forward curved FC fan. Notice there is a substantial reduction in capacity if no duct is used. A duct of 1½ fan diameters reduces the volume from the code test only a slight amount while a duct of 3 diameters provides almost the same result as the code test.

As a general rule, an effort should always be made to carry a straight duct the same size of fan discharge for at least 1½ fan diameters from the discharge. With multiple fan units, install a "pair of pants" as shown in Fig. 8.

Discharge Elbows. When, because of job conditions, the elbows must be installed near the fan discharge, undesirable results can often be minimized by the use of vanes and by proper selection of fan discharge location and rotation.

If it is necessary to place an elbow near the fan discharge when the velocity is not uniform, arrange to have the high velocity side at the outside radius of the elbow rather than on the inside. Elbows with an inside high velocity may have a pressure loss of four to five times under that achieved by uniform distribution. In contrast, high velocity on the outside may even make the pressure drop less than it would be without uniform distribution.

Elbows on single width fans which turn to discharge parallel to the fan shaft will generally have a lower loss if the turn is toward the inlet rather than away from it, as shown in Fig. 9. On single width fans, both forward curved Type FC and non-overloading Type BI, the highest velocity is at the side opposite the inlet.

Correcting a Pulsating Condition. As an example of how conditions at the discharge can affect the entire operation of the system, consider an installation as depicted in Fig. 10. This was a large, non-overloading type fan installed in a textile mill. It was reported that the system was pulsating so badly that some of the ducts were being torn apart. The sides of the air washer plenum were also oil canning. Everything that could move that was in any way connected with the system was vibrating excessively.

The splitter damper at the fan discharge had been installed in the position shown to get the proper balance, even though only about one-third of the air was needed down this duct. Because of a booster coil in this duct, its pressure loss at the proper volume was somewhat greater than in the other duct. With the splitter set as shown, the fan had a tendency to discharge the air into duct *A*. Because it could not flow down that duct, it had to bounce back and go down the small space between the splitter and the side of the trunk duct into duct *B*.

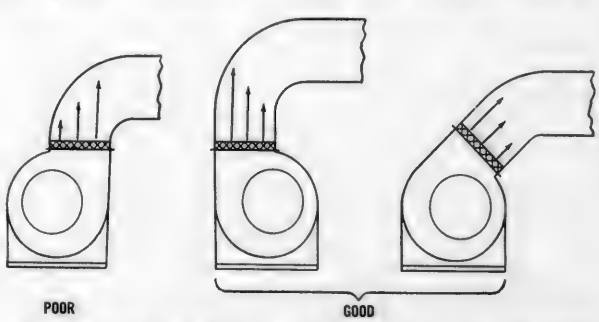


Fig. 9. Proper discharge connections can minimize capacity reduction.

When this splitter was removed and louver dampers were installed to get the proper balance, the pulsating effect was eliminated and the entire system operated smoothly.

This should give you some idea of the troubles encountered if fans are not properly installed and what to look for in systems that are not functioning properly. With this material as background, let's look at a checklist of what to look for when a capacity deficiency is suspected.

Check the Fan

First consider fan wheel rotation. It is easy to connect wires to the motor so that the fan will rotate in a direction opposite to the right one. The two most commonly used fans are the forward curved multi-blade type which should operate with the blades curved toward the direction of rotation; the BI, or non-overloading type, which has the blades laid back to the direction of rotation. Neither fan operating in the wrong direction will deliver near its rated capacity.

Fan RPM. Be sure that the fan is operating at the proper rpm. Even though the correct drive has been used, the adjustment of the variable pitch sheave may be incorrect or belts may not be snug enough to eliminate slippage. Belts should be snug, but not tight enough to materially increase the bearing load and shorten bearing life. If belt tension is right and the belts still slip, wipe them and the pulley with a cloth saturated in carbon tetrachloride to remove any grease or oil.

Clearance Between the Fan Wheel and Inlet Cone. Manufacturers have established proper clearance between the fan wheel and inlet cone to give optimum results. This clearance should be as shown in Fig. 11.

Dirt on Fan Wheel. Be sure that the fan wheel is clean. Sometimes the blades of fan wheels are filled with lint or dirt and they cannot possibly develop their rated capacity.

Check the System

If the fan seems right, then check the system. In addition to the things that have been enumerated under general installation, look for:

1. Dampers that may be closed
2. Filters that may be dirty
3. Coils that are plugged with dirt.

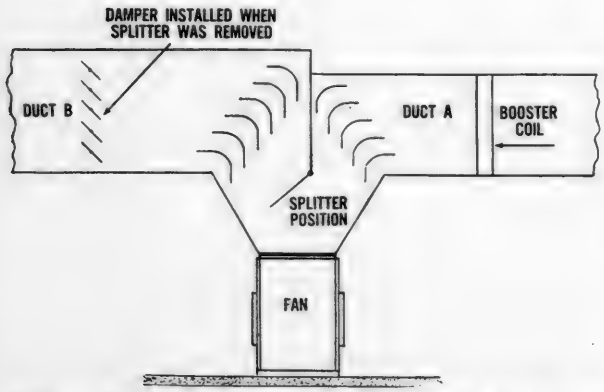
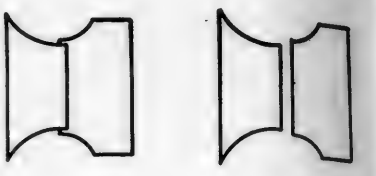


Fig. 10. Diagram of system where pulsating trouble was encountered.

Fig. 11. Proper clearance between fan wheel and inlet cone is shown at left.



This may seem elementary, but it is surprising the number of times these points have been overlooked.

Vibrating Fans

Excessive fan and unit vibration can be caused by a number of things. They are:

1. Misalignment of bearings, couplings or drives.
2. Bearing inner races loose on the shaft.
3. Fan wheel loose on the shaft.
4. Uneven dirt accumulation on the wheel.
5. Damaged wheel or uneven corrosion on the wheel.
6. Bent fan shaft.
7. Unbalanced drive sheaves.
8. Unbalanced motor.
9. Improper isolation under the fan or too light a foundation.

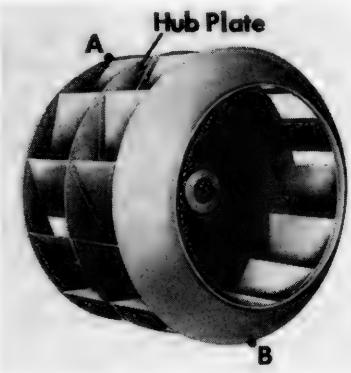


Fig. 12. Equal weights placed at A and B may put the wheel in static balance but still cause severe vibration.

Any defects found must be corrected. All set screws should be securely tightened, drives and bearings properly aligned and the fan thoroughly cleaned.

If there is any reason to suspect that the motor is out of balance, belts should be removed and the motor run by itself. If it proves to be unbalanced, you will want help from the manufacturer.

Shaft straightness should be checked with a dial indicator. Be sure that the check is made on machined surfaces near the hub of the wheel rather than at points where the shaft may be corroded or not machined to close tolerances. If the shaft is not true, it should be removed and straightened.

Light foundations may also be a source of trouble. The foundation must be heavy enough to resist the forces set up by moving machinery.

Check for Balance. If, after all else is in good working order, it is found that the equipment is still vibrating, the fan wheel should be checked for balance. At this point it might be well to review the difference between static and dynamic balancing, because this knowledge is necessary to properly balance fans anywhere.

Static balancing is done by adding corrective weight in a single plane such as the hub plate of the DW fan

Fig. 13. Typical electronic balancing machine.

shown in Fig. 12. The balancing is done on static ways, and weights are added to counteract the heavy spots until the wheel will stay in any position.

Visualize what will happen if a weight is added at point A in Fig. 12, and another weight of equal magnitude is added at point B, 180 deg from the first weight position. The wheel is still in static balance, but what happens when it operates? Each weight sets up forces in its plane which would cause severe vibration.

The purpose of dynamic balancing is to counteract the effect of such unbalance. Figure 13 shows a typical balancing machine. It is an electronic balancer that gives the position of unbalance and the amount of unbalance in one operation. To check the balance on one side of the fan, one bearing is secured while the other is permitted to float. The machine will now pick up any vibration as it is affected by unbalance on the floating bearing side of the fan. After this correction is made, the other bearing is fixed and the balanced side is permitted to float. Now the machine will determine the amount and position of unbalance on this side of the fan. After this operation, the fan will be in static and dynamic balance.

Static and dynamic balance can be accomplished in the field without elaborate equipment. A fairly simple and effective method requires only a vibrometer and a set of weights of various sizes. A vibrometer is a simple instrument consisting of a weight, a spring and a dial indicator to measure the magnitude of vibration.

The balancing is done in two steps. Static balance is achieved by adding a temporary weight to the hub plate near the outer periphery. The fan is then operated at its regular speed, and the amount of vibration at a given location on the fan is measured by a vibrometer and recorded. The weight is then moved to a new location about 30 deg from the first position. The fan is again operated and the amount of vibration recorded. This process is repeated until 12 readings have been made.

The weight location at which minimum unbalance occurs should now be apparent from the readings. By adding more or less weight at that point, determine the amount of weight that gives minimum vibration as measured by the vibrometer. After the exact amount of weight and its location has been determined in this manner, a weight of like amount should be permanently attached.

In some cases, static balancing will result in smooth operation. In other cases, it will be necessary to balance in two planes rather than a single plane. This is done by attaching two equal weights on opposite sides of the wheel and 180 deg apart. The fan is operated and a check made of the magnitude of vibration with the vibrometer. Continue on through the 12 positions around the wheel, and then determine the weight location that has given the least amount of vibration. At that point, add more or less weight until the best results are obtained. After the location and weight size are determined, with temporary weights, permanent weights of the same size are added.

It is important that the weights be securely fastened because the centrifugal force on the weight can be great. For instance, a 4-ounce weight on a 60 in. fan running at 800 rpm must be fastened securely enough to resist a centrifugal force of 175 lb.

If the points mentioned are systemically checked, most fan troubles may be eliminated.

Changing Fan Speed

There may be times when it is necessary to change the speed of a fan. No precautions need to be taken if the speed is to be slower than it was. If it is necessary to increase the fan speed, however, the acceleration should not exceed the maximum permitted speed of the wheel or approach the critical speed of the shaft. Before the speed of a fan is increased, check with the manufacturer of the unit for the maximum speed at which the fan or unit was designed to operate.

Preventative Maintenance

The importance of maintaining equipment to prevent critical breakdowns is self-evident. This means that equipment must be carefully inspected periodically. In the case of fans and air handling units, it should be done at least twice a year.

Cleaning and Painting. During these semi-annual inspections, the equipment should be thoroughly cleaned. The moving parts are most critical. Inspect the wheel for excessive corrosion and erosion. If this seems to be sufficient to cause failure before the next regular inspection, make arrangements to have the part replaced. If the wheel is in good condition except that the protective coating has been removed, repaint in accordance with the practice that is used on this type of equipment in your plant. A good grade of water resisting paint may serve the purpose.

During the semi-annual inspection, shafts should be inspected and if the protective coating has been removed, it should be replaced.

At the time of the inspection, the fan housing and other parts should also be given careful attention. Clean the surfaces and repaint when needed.

Remember that any paint job is only as good as the surface preparation, be sure that all loose paint is removed, that base metal is free of rust and scale and that surfaces to be painted are carefully degreased.

Bearing Care. Bearing lubrication should follow a regular schedule at much more frequent intervals than the semi-annual inspection. Follow the instructions of the bearing manufacturer. Be careful of over-lubricating ball bearings. Over-lubrication can be more serious than under-lubrication. It may force grease seals out of place and churn the grease to a point where oils and soaps

will separate, leaving a hardened mass in the bearing.

Of the hundreds of different bearings that are used on different equipment, each must be lubricated in accordance with the manufacturer's recommendations for best results. In like manner, the dismantling and the repair is handled differently. Remember that on all anti-friction, ball and roller bearings the inner race must be securely fastened to the shaft. It is extremely important that this be done strictly in accordance with the manufacturer's recommendations. Do not assume that you know how to do it because you have worked with bearings of another make. Read the instructions.

Dampers and Inlet Vanes

The dampers and inlet vanes furnished with air conditioning units and built-up systems should be cleaned and repainted if necessary during the semi-annual inspection. Check the linkings for adjustment, and oil all bearing surfaces with SAE No. 20 machine oil. Grease bearings where grease fittings are provided and apply a good grade of graphite grease to ball and socket joints.

Humidifiers

Three types of humidifiers are generally furnished with units. These are the spray, steam grid, and steam pan types shown in Fig. 14.

Spray type humidifiers should be inspected and cleaned. Any lime accumulation can be removed by taking the spray assembly apart and cleaning it in Oakite solution. After cleaning, all parts should be washed in clear water before reassembling.

The steam grid humidifiers need little attention except that the asbestos wrapping should be inspected to make sure that it is in good condition. If the covering is worn due to steam erosion, it should be replaced. The wrapping consists of a layer of asbestos which is held in place with galvanized wire.

Steam pan humidifiers should be inspected regularly and cleaned of any accumulation of lime resulting from water evaporation.

Drain Pan

Drain pans should be flushed clean during the semi-annual inspection. Be sure that water drains freely through the drain connection and drain lines. Some pans are lined with fiber glass which is covered with special sealer. Inspect this material to see that it is not damaged. If it is, apply a sealer coating. Be sure that the surface is completely dry before applying the sealer.

Fig. 14. Three humidifiers, any one of which is commonly furnished with central station cabinet air conditioners. From the top down, these are spray type, steam grid, and steam pan.

Replacement Parts

When breakdown replacement parts are required, be sure to give complete information. This information will insure that you will get the correct parts.

1. Unit description
2. Unit size
3. Serial number
4. Detailed part description

Any additional information regarding the date of the installation and the name of the contractor who made the installation would also be helpful.

In conclusion, emphasis should be placed on preventative maintenance, for in accordance with a planned schedule, it will pay big dividends in preventing expensive repair bills and eliminating costly shutdowns.

BRAD to Make Studies for the FHA

The Building Research Advisory Board, under a contract signed between the National Academy of Sciences and the Federal Housing Administration, will undertake six new advisory studies and make recommendations of helpful and practical assistance to the FHA in establishing new technical criteria for consideration in Minimum Property Standards revisions or Materials Releases. Subjects of five studies are:

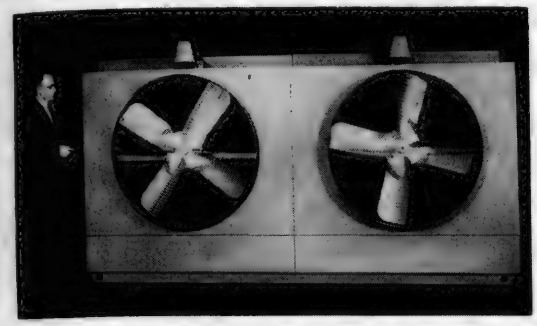
1. A determination of whether or not concrete admixtures are effective as a protection against ground moisture and vapor penetrating a slab-on-ground construction, and to develop test procedures.
2. A determination of experience with various types of materials and methods of installation used for residential building sewers, and any needed modifications in the present requirements.
3. A determination of conditions under which a moisture barrier is needed for a slab-on-ground above grade level, and conditions under which the barrier may be located on top of a slab; moisture protection needed for slab and walls of habitable spaces below grade.
4. A determination of physical and thermal properties that should be required of products proposed for use as warm air heating and air conditioning ducts, for exposed locations in walls, attics, and crawl spaces; and to evaluate methods of installation and test.
5. A determination of criteria for proper design and construction of heated and unheated slabs-on-ground to insure structural soundness.

NEWS OF EQUIPMENT AND MATERIALS

Use the convenient prepaid postcard appearing on the last page for securing further information on new equipment and materials described in this department.

High-Tonnage Towers

Twin fans in its 80 and 100-ton cooling towers introduced by Halstead & Mitchell, Pittsburgh, Pa., result in very quiet operation. Making use of large diameter, 4-bladed, deep pitch fans, these cooling towers are belt-



driven at low speeds by special weather and splash-proof motors.

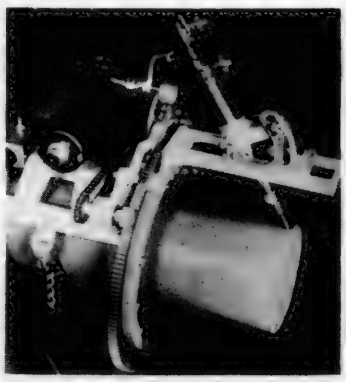
The addition of the new towers extends the range of company's EC line to 12 models ranging in size from 5 through 100 tons.

Units have 20-year guarantee on the wetted deck surfaces against rotting or damage due to fungus attack. Rugged 14-gage steel cabinets are weatherized by applications of vinsynite, vinyl zinc and chlorinated rubber for increased resistance to corrosion. Sealed fan bearings are lubricated for life. Gravity-type distributing pans reduce pumping head and cut down windage losses. Sump water levels are automatically controlled by integral float valves.

More information? Circle Item 1, postcard, last page.

Unit Motorizes Pipe Cutting

A motorized attachment that provides automatic operation in cutting and beveling on pipe ranging in size from 1½ to 36 inches is announced by H & M Pipe Beveling Machine Co., Tulsa, Okla.

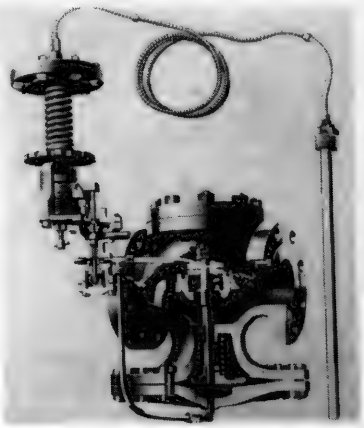


Unit is powered by a fractional-hp ac-dc motor affixed to the machine by means of a mounting bracket. A flexible coupling connects motor with crank pinion, driving the main gear and cutting torch around the pipe. To operate, one sets the governor-controlled motor to the required speed to assure smooth, clean cutting; lights the cutting torch; and turns the switch to the direction of travel desired.

More information? Circle Item 2, postcard, last page.

Heating Steam Regulator

Available from Spence Engineering Co., Inc., Walden, N. Y., is a temperature regulator consisting of the company's Type E main valve controlled by the new T124 or T134 pilot. Both pressure and temperature are controlled by a single pilot. The T124 pilot, shown in illustration, is recommended for heater pressure over 10 psi, and the T134 pilot is for heater pressures of 10 psi or less. Thermostatic temperature control up to 350 deg F can be achieved.



The new pilots are recommended for regulating the flow of steam for heating purposes in such applications as instantaneous domestic water heaters, heating convertors, blast coils, oil pre-heaters, and processing heaters. They will fit any of company's main valves now in use.

Adjustment for pressure and temperature is simply obtained by turning the temperature adjusting wheel and the pressure adjusting handle, both easily accessible on the pilot. Dial thermometer and adjusting handle can be furnished on the same pilot. With this combination of pressure and temperature control, response of the regulator to changes in load is instantaneous.

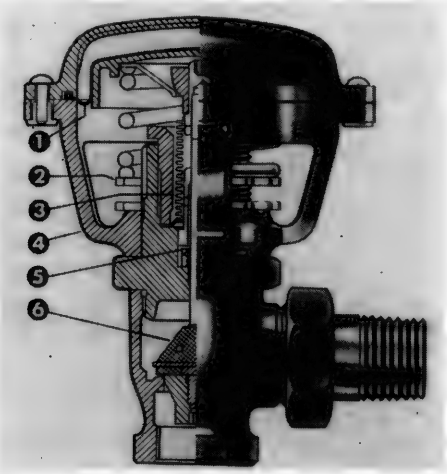
More information? Circle Item 3, postcard, last page.

Paint Filters for Spray Booths

Several illustrations appeared in the article by Sidney Marlow in last month's issue and titled "Spray Booths with Paint Filters." Unfortunately, due to an oversight, two illustrations, Fig. 4 and 5, were not credited to their source, Research Products Corporation. This company manufactures filters especially intended for such applications in the form of its R P Paint Arrestor which was the subject of the two drawings referred to.

Adjustable Packless Valve

Improved control of unit conditioners, unit ventilators, and convectors is provided by a corrosion-proof, adjustable packless valve announced by Powers Regulator Co., Skokie, Ill.



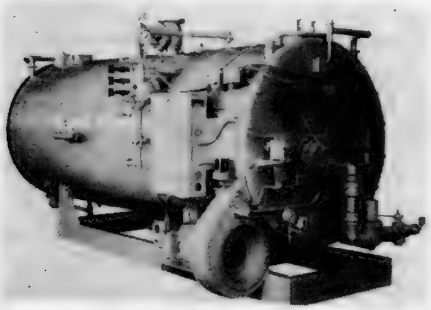
Features of Powertop valve are shown above. (1) is the 10-square-inch silicone diaphragm, which provides 60% greater closing power than previous models. (2) is the externally adjustable spring which can close between 5 to 12 psi, and has a 5-psi range. (3) is the heavy-duty packless bellows which acts as the primary seal. (4) is the lower housing made of high-impact phenolic to eliminate electrolytic corrosion. (5) is the neoprene quad ring secondary seal, which prevents leakage if the packless bellows is damaged. (6) is the buna N disc suitable for steam and water up to a maximum of 250 deg F (15 lb steam).

More information? Circle Item 4, postcard, last page.

Boiler Controls Simplified

Model R Amesteam Generator automatic boiler, announced by Ames Iron Works, Inc., Oswego, N. Y., has relocated auxiliaries and controls which are said to greatly simplify operation. In other respects, it is similar to company's prior X and Y models.

Offered in sizes 10 to 150 hp for pressure to 250 psig



for oil, gas, or gas-oil, it is delivered ready to install. Among its features are 3-pass concentric tube design, permitting use of one-piece rear baffle and one-piece fuel covers; and plastic refractories, inexpensive to obtain and install when replacement becomes necessary. Simple wiring pattern permits easy understanding of the system's operation. Relocation of fuel pump eliminates the need for booster pumps to overcome the resistance of long runs of suction piping.

More information? Circle Item 5, postcard, last page.

Centrifugal Roof Exhausters

Penn Ventilator Co., Philadelphia, Pa., has extended the Domex line through higher capacity V-belt drive centrifugal exhausters. These Series RB and QB units feature streamlined, spun aluminum housings, blending attractively with modern building lines.

A deep, one-piece throat, called the Significant Scroll, handles higher air volumes effectively. Fan wheels up to 36-inch dia are available. A factory-installed electrical conduit permits easy field wiring. Units are shipped completely assembled and ready for installation as a package.

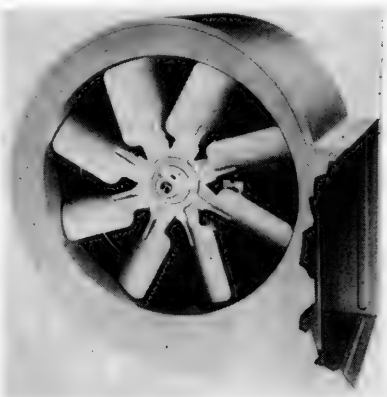
A bulletin giving performance tables, dimensions, and line drawings of units is available from the company.

More information? Circle Item 6, postcard, last page.

Mixed Flow Blower Unit

Radiax, a blower announced by The Torrington Mfg. Co., Torrington, Conn., is a symmetrically constructed direct-drive unit with power and pressure characteristics suited for furnace and air conditioner applications. It will be offered in 4 models covering a flow range from 500 to 1500 cfm against typical back pressures.

Unit is said to have a non-overloading power characteristic. A flat power curve permits impellers to run at



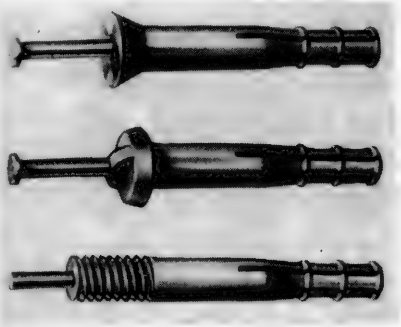
any operating point with the same motor. The motor need not be changed for operation in another system. Further, manufacturer states, blower has higher operating efficiency than direct-drive centrifugal units when applied in warm-air furnace or air-conditioning applications. No motors in the air inlet contributes to good air distribution at the outlet.

The motor, supported at its center of gravity, obviates the need for special shipping brackets. Unit is narrower than an equivalent centrifugal blower unit, the company states.

More information? Circle Item 7, postcard, last page.

Pin Bolt Drives

Available from J. D. Polis Manufacturing Co., Chicago, Ill., are Bulldog pin bolt drives, all-steel units assembled and ready for use. Each drive is a combination bolt and expansion fastener; no screws are required. As illustrated, drives are round head, flat head, and stud head types.



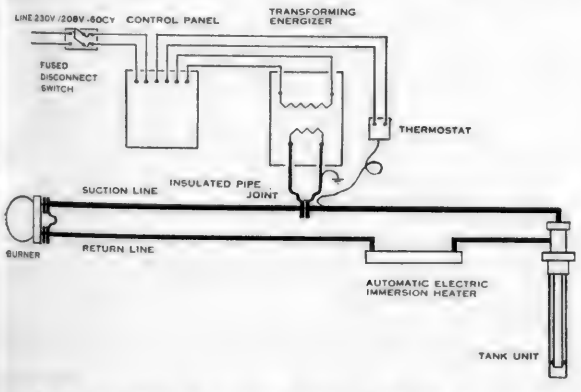
Drives are available in lengths ranging from ¾ to 2 inches. There is graduated expansion from the bottom of the ¼-inch drilled hole providing a safe and dependable grip in concrete, brick, cinder block, tile, and wood.

Applications include anchoring conduit and control boxes, piping, ductwork, lighting fixtures, and unit heaters.

More information? Circle Item 8, postcard, last page.

Heavy Fuel Oil Pre-Heating System

The Thermal Electric System for heavy fuel oil burning facilities is a hydraulic accomplishment achieved by means of electricity. The low cost system, developed by Fluid Systems, Inc., New Haven, Conn., is guaranteed to remove No. 5 or 6 fuel oil from storage without auxiliary heat in storage; to deliver the fuel oil to any make of



residual oil burner at not less than 120 deg F under all conditions of flow; to raise pipe and contents to design temperature after extended shutdown of operations.

Consisting of six components, the system utilizes low voltage alternating current, impressed on the same pipe in which oil is contained, to maintain constant temperatures throughout the piping system. During flow, the oil enters the suction line at transportation temperature of not less than 120 deg (for maximum viscosity of 300 SSF). This is accomplished by returning the excess pump rate of oil through return line electric immersion heaters which elevate oil temperature to a range between 150 and 200 deg. This oil enters the company's tank unit, a mixing device, and blends with unheated oil drawn from the storage tank in the amount necessary to make up the full pump rate at transportation temperature.

A technical manual describing the system is available from the company as is UL report MP-2047.

More information? Circle Item 9, postcard, last page.

All-Plastic Y-Type Strainer

An all-plastic, Y-type sediment strainer is introduced by Walworth Company, New York, N. Y. Made of corrosion-resistant rigid polyvinyl chloride, the new strainer is designed for service on alkalis, acids, inorganic salt solutions, and other corrosive materials.

Strainer screen is of rigid PVC sheet with 1/32-inch holes. Open area of the perforated screen is at least twice the cross sectional area of corresponding Schedule 80 pipe, thus assuring adequate flow. The screen, which is welded to the strainer cap, is merely unscrewed for cleaning.

The PVC strainer has a service rating of 150 psi at 75 deg F and 75 psi at 150 deg. It is available with either threaded, solvent-weld socket-type, or flanged ends, and comes in five sizes from ½ through 2 inches.

More information? Circle Item 10, postcard, last page.

New PVC Line Manufactured

Entrance into the plastic pipe field, on a national basis, with its own line of PVC (polyvinyl chloride) pipe for a broad field of industrial applications was announced by A. M. Byers Co., Pittsburgh, Pa. The new plastic pipe is said to be a highest quality thermo plastic product made for Byers by General Tire & Rubber Company.

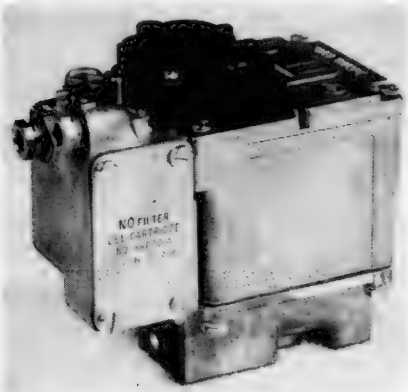
Two types of pipe are offered. Type I is a pure PVC that is particularly adapted to chemical and related applications, and Type II is a similar product modified with rubber to give it high impact and better service in mechanically punishing applications. Both types are available in three wall thicknesses: standard weight, heavy, and extra heavy. Broadest fields of application are in the chemical and oil industries, handling extremely corrosive materials. Particular services include pipelines for chemicals, food processing, petroleum products, drugs, pulp and paper processes, mining, and other process industries.

An illustrated catalogue is available which gives complete engineering data on PVC applications, working pressures, and other information particularly useful to specifying engineers.

More information? Circle Item 11, postcard, last page.

Gas Valve and Pilot Safety Control

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., has introduced a combination gas valve and automatic pilot safety control for residential central heating units. Designated V81 it eliminates the necessity of installing and wiring a separate pilot safety control.



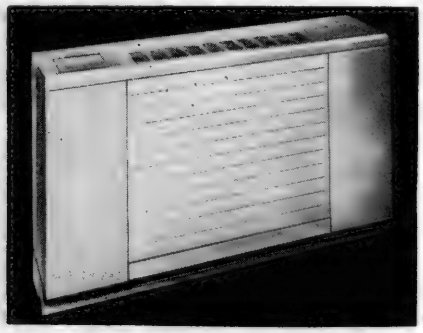
The gas valve portion of the device is the same as company's service-free, field-proven V80. Pilotstat (pilot safety control) is attached in a separate casting to the upstream side of the gas valve. In addition to housing the switch-type assembly, the casting, depending on model, contains a pilot filter, *B* cock, pilot gas flow adjustment and 100% shut-off. All models of the V81 have a safe-light feature.

More information? Circle Item 12, postcard, last page.

Commercial Fan-Coil Unit

Capitolaire Ver fan-coil unit, most recent hydronic heating and cooling unit to be announced by Heating and Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa., was designed especially to provide temperature and humidity control throughout large buildings.

Each unit handles both heating and cooling, and while each unit in the building operates independently to allow the occupant to dial his own climate, all are supplied with water from central boiler and chiller units. Sizes available permit practical selection of an economical size for



every application. Built into a cabinet of heavy furniture steel and finished with baked-on, two-tone enamel, units are 9½ inches deep. The largest console models can be semi-recessed so that only 6 inches of floor space is used. Adjustable fresh air intake is furnished on each unit.

A 3-speed motor control system offers three capacities in each unit and reduces capacity for winter heating without disturbing drafts or constant short-cycling, the company states. Thermostatic control is available.

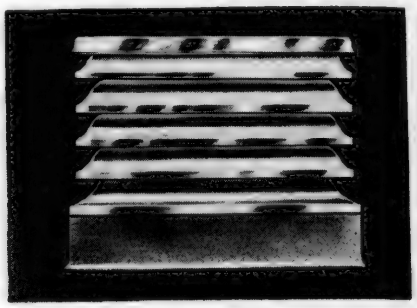
Quiet operation is facilitated by mounting the blower motor in rubber, and insulating air passages. Entire unit is furnished with a rubber gasket on rear, overcoming uneven wall problems and eliminating the necessity of a direct connection with outside air intake.

More information? Circle Item 13, postcard, last page.

Extruded Aluminum Penthouse

Prefabricated extruded aluminum penthouses for air intake or exhaust through the roof, are available from Titus Mfg. Corp., Waterloo, Iowa.

S-shaped louvers extend continuously on 4 sides and



present a streamlined look that blends in well with the lines and contours of the building proper.

The entire penthouse, with the exception of the roof, is made of extruded aluminum sections which are easily and quickly assembled to set on existing curbs. Roof cover is made of one-piece, 12-gage, sheet aluminum. It is furnished with undercoat insulation and sound deadener. Roof supports are provided if needed.

Penthouses are custom manufactured to any curb size desired. They are available in standard mill finish with protective lacquer, or anodized in any color.

More information? Circle Item 14, postcard, last page.

Remote-Type Water Cooler

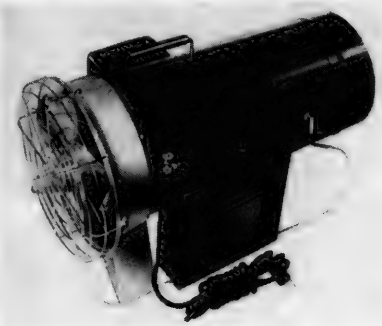
A remote-type cooling unit is now available in an extremely small size that meets all requirements for a built-in water cooler. This recent addition to the company's line of recessed panel coolers is Model RPT-5, furnished by Sunroc Corporation, Glen Riddle, Pa.

The model is slim, measuring only 6¾-inches deep. It also features reduced height of 21½ inches that makes it suited for built-in-wall location, and easy installation under cabinets, counters, or in extremely small areas of all kinds. This highly versatile unit has a 5 gph capacity that is adequate for up to 60 persons in most office locations, and it is easily hooked up to any type of wall fountain, water station, and other dispensers used in commercial and institutional buildings. When the unit is installed inside the wall, it is available with a bar type grille that covers the wall opening for access.

More information? Circle Item 15, postcard, last page.

Automatic-Ignition Heater

Insto-Gas Corp., Detroit, Mich., announces automatic lighting as an innovation in blower-type portable heaters in their Model 1710. The model is equipped with automatic continuous ignition. One switch starts the heater. Gas and ignition shut off in the event of power



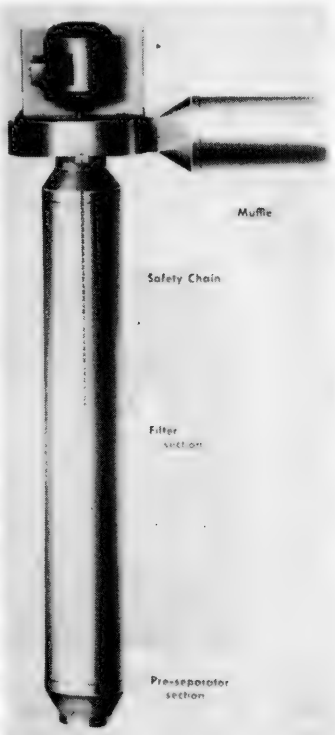
or flame failure. Heater restarts automatically when power is restored. 100% safety shut-off and other safety controls including flame detector assure safety and economy of operation.

The Model, which burns LP gas, is 21¾ inches long, 17¾ inches wide, 13¾ inches high, and weighs 40 lb. It operates from 110-115 volt a-c, and uses 180 watts.

More information? Circle Item 16, postcard, last page.

In-Pipe Mist Collector

Mistender, a mist collector which makes the usual dropper pipe serve not only as a connection between the source of the mist and the blower, but also functions as the enclosure for the filter and the pre-separator, is announced by Dustender Co., Ann Arbor, Mich.



Designed for installation overhead to save floor space, this pipe-type collector uses a slightly larger-than-usual pipe to enclose a filter that is adapted for separating mist from the air stream and returning it to the source as re-usable condensate. The pre-separator causes most of the mist as well as the solids to throw-out and also be removed as condensate through contact with the inside surface of the pipe. A considerable volume of solids, fog, and mist, it is claimed, is removed in this way, and never touches the filter.

To save heat, the cleaned air is usually returned to the working space. An accoustically lined muffle subdues air noise. However, exhaust to the outdoors when required by reason of noxious fumes is by means of standard sheet metal pipe which replaces the muffle.

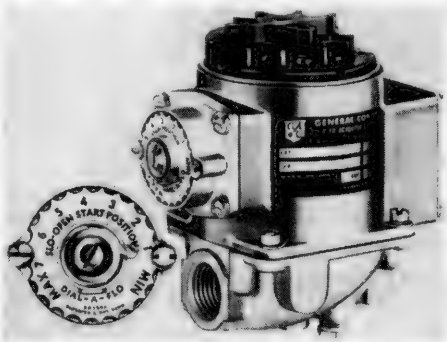
Model M-5, illustrated with continuous duty ⅓-hp motor, drives high-efficiency fan having a rated capacity of over 500 cfm. Unit is recommended for collecting mist and fog from small tap, centerless and thread grinders, and screw machines as well as for surface grinders employing coolants.

Pipe enclosing the filter is 6 ft long with the overall length, including motor, being 8 ft. Inlet connection is for 5-inch dia pipe or flexible hose. Not shown is motor enclosure with support brackets, removed for the photo.

More information? Circle Item 17, postcard, last page.

Gas Valve Flow Selector

A development in main line electric gas valves is announced by General Controls Co., Glendale, Calif., with the introduction of the new step-opening feature called Dial-a-Flo. For the first time, the company states, manufacturers can tailor valve performance to their exact requirements by merely setting the dial.



Dial-a-Flo has been incorporated on the company's K-3H valve, the only sealed operator valve with silicone fluid which maintains uniform operating characteristics under all weather conditions. For quiet ignition, elimination of roll-out and attendant pilot outage, the valve opens to the adjustable, pre-set start position, thereafter continuing to open slowly until satisfactory burner operation is established.

More information? Circle Item 18, postcard, last page.

Water Temperature Limit Switch

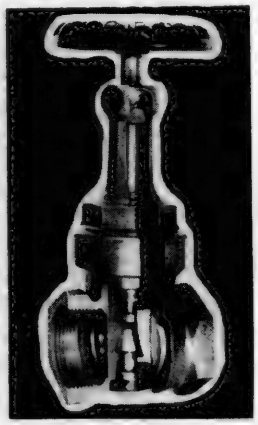
A high temperature limit shut-off switch for water heaters is announced by Grayson Controls Div., Robertshaw-Fulton Controls Co., Long Beach, Calif.

The switch automatically shuts off the flow of gas to the main burner and pilot when water temperature in the heater tank becomes excessive or unsafe. It operates by breaking the electrical current between thermocouple and magnetic coil, which causes the automatic pilot valve to shut off completely all gas.

More information? Circle Item 19, postcard, last page.

See Valve Position at Glance

Illustrated is a gate valve now in production at The Sterling Brass Co., Cleveland, Ohio, with rising stem that assures quick, visual identification of *open* or *closed* positions, since a full inch difference is apparent between the top of the handle and the valve body when in *open* position.



Also, a double split gate is operated by a self-aligning, sure seal, operating mechanism. Valve mechanism is operated by a malleable cast iron handle with a locknut and is available in both iron pipe size and copper.

Sizes range from 3/8 to 2 inches. The valves from 3/8 through 1 inch are tested at 150 psi, while the 1¼, 1½ and 2-inch sizes are 200-psi tested.

More information? Circle Item 20, postcard, last page.

New Insulation Adhesives

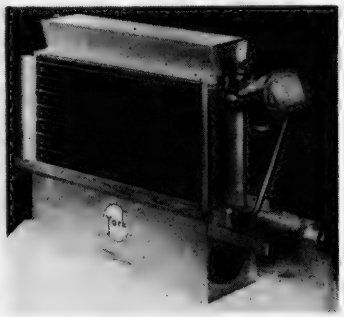
New insulation adhesives for heating and air conditioning ducts and pipes are announced by St. Clair Rubber Co., Detroit, Mich.

These adhesives, SC 4815 for bonding insulation to ducts, and SC 4851 for sealing lap seams on pipe covering, are said to offer a better, neater job at 50% savings in labor cost and approximately 30% less for total job cost.

More information? Circle Item 21, postcard, last page.

Lower Cost Induction System

A system of induction air conditioning which will represent substantial savings to building operators in initial costs, installation and operation has been developed by York Corporation, subsidiary of Borg-Warner, York, Pa. Based on a high-capacity, double coil room unit, shown in illustration, with higher secondary coil capacity than any other unit using a filter, the system is the most efficient induction air conditioning system yet devised, the company asserts.



A feature of the new system concerns the changeover point when outside temperatures require peripheral heating rather than cooling. In conventional induction air conditioning systems, the changeover from chilled to hot water takes place at a relatively high (40 to 50 deg F) outside temperature. In the company's new system, there need be no changeover from chilled to hot water.

Initial cost savings to building owners result from the use of smaller primary air preheaters, dehumidifiers, reheaters and central fans as well as smaller primary air ducts than are used in conventional systems. Installation costs are cut by the need for less rigging and assembly time due to the use of smaller equipment. Also, the ductwork, being smaller than that used in conventional induction systems, can be furred into standard building columns, with a commensurate saving in column construction cost as well as floor space. Operational savings on the new system are also said to be considerable. Company engineers claim that preliminary studies show that the system is at least 10% more economical than conventional induction systems in steam and power costs. In both summer and winter, lower horsepower is required to run the central fans.

The new heating and cooling system, according to the company, is especially suitable to multi-story, multi-room buildings with long perimeters, narrow floor plans, and maximum window areas.

More information? Circle Item 22, postcard, last page.

New Air Purger Sizes

Three new boiler fitting sizes in its Airtrol system of controlled air in hot water heating are offered by Bell & Gossett Co., Morton Grove, Ill. These sizes are a large 6 x 6 inch and a small 1½ x 1½ inch fitting for side-outlet boilers, and a ABFS 1¼ x 1½ inch fitting for top-outlet boilers.

Airtrol is the name of company's exclusive system of controlling air in hot water heating lines by removing air right at the boiler. Thus, no air is permitted to enter the heating lines to cause noise or retard circulation.

More information? Circle Item 23, postcard, last page.

Turbine Ventilator Announced

A turbine ventilator, designated Model T, is announced by Triangle Engineering Co., Houston, Tex. A new bearing design reduces moving parts to a minimum. Although periodic lubrication is recommended, years of

satisfactory service can be obtained even without lubrication, the company states. Available in size of 6 to 48 inches in galvanized iron, aluminum, copper, and stainless steel.

More information? Circle Item 24, postcard, last page.

All-Fuel, Prefabricated Chimney

A new, all-fuel, prefabricated chimney, developed and manufactured by William Wallace Co., Belmont, Calif., has been introduced under the name Metalbestos Chimney. The chimney is suitable for use with residential heating appliances, low-heat industrial appliances and domestic incinerators burning any type of solid or liquid fuel including oil, gas, wood and coal.

Listed by Underwriters' Laboratories as fulfilling new, exacting test requirements for factory-built chimneys, the chimney is constructed on the double-wall principle first introduced to vent design in the company's Metalbestos gas vent pipe. Mineral fiber, packed between a galvanized steel outer wall and stainless steel inner wall, provides the high insulation necessary to create and maintain a quick, strong draft, and is light weight for easy handling.

More information? Circle Item 25, postcard, last page.

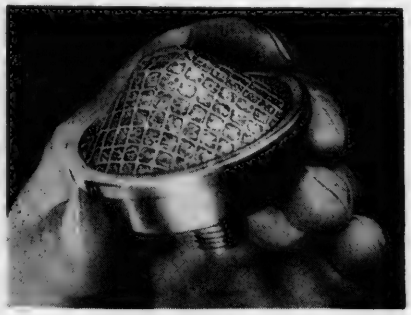
Slimicide

A metallo-organic slimicide is available from United Chemical Corporation of New England, Providence, R. I., Called El-Tox, it is not a mercury salt, a chlorinated phenol, or a hypochlorite, company states. It is said to seek out slime and destroy it in all parts of the system. It is effective in dosages as low as 200 parts per billion.

More information? Circle Item 26, postcard, last page.

Silencer for Air Exhaust

A compact silencer developed by Air-Maze Corporation, Cleveland, Ohio, effectively attenuates objectionable noise from air exhausts without noticeably impairing efficiency of air-operated equipment. By breaking up shock waves created when exhausting compressed air to atmosphere,



noise levels are greatly reduced to help eliminate excessive fatigue to workmen and thus improve comfort and working conditions. High efficiency of the air-operated equipment is also effectively maintained since noticeable build-up in back pressure is successfully avoided.

Known as Mufflㅡ-Maze, the silencer is a compact, self-contained assembly that mounts directly on any discharge port or piping by means of standard pipe thread. The unit utilizes metal media allowing the complete assembly to be cleaned with any commercial solvent.

Effective also as an intake silencer, the unit is applicable for use on vacuum pumps and small gas engines. Standard sizes are for 1/8, 1/4, 3/8, 1/2, and 3/4-inch pipe.

More information? Circle Item 27, postcard, last page.

Circular Condensers

An air cooled condenser with circular sloped tube design is offered by F5 Air Conditioning Corp., Tulsa, Okla. Design permits 100% counterflow and tube drainage, company states, eliminating dead spots found in rectangular condensers. Each tube layer is made of one continuous single tube length. There is a constant slope from the inlet to the outlet of each tube since each layer is 2½ diameters lower at the outlet end than at the inlet end.

No welded joints or return bends are present to increase pressure drop and lower velocity while the long sweeping circle is said to approach the almost non-existant pressure drop of a single-pass condenser while retailing the advantages of a 5-pass unit. Fin tube design provides balanced ratio of fin to prime surface for optimum condensing temperatures and a generous amount of sub-cooling. Units are available in sizes from 2 to 30 tons.

More information? Circle Item 28, postcard, last page.

Portable Room Heat Pump

A portable room air conditioner, weighing less than 60 lb, which heats as well as cools and can be used to remove basement dampness, is introduced by Carrier Corporation, Syracuse, N. Y.

When mounted in the window as a convential room air conditioner, it cools and dehumidifies, filters and circulates the air. When reversed, it becomes a heat pump to warm the room air. Because of this dual operation, the portable is equipped with identical grilles on either side. Its turn-around feature makes it the first air conditioner to include both interior and exterior styling, the company states.

Equipped with a built-in handle, it can be carried from room to room and easily placed in either position in the window. It can also be used as a dehumidifier in basements or other locations where dampness is a problem. Operating on standard household electrical current, the portable draws only 7½ amps of electricty.

More information? Circle Item 29, postcard, last page.

Shell and Tube Heat Exchangers

Expansion of its line of Karbate brand impervious graphite shell and tube heat exchangers is announced by National Carbon Co., New York, N. Y., a division of the Union Carbide Corp. Three new sizes, with 8-, 42-, and 45-inch dia shells, bring to 16 the total of standard heat transfer units available for corrosive service.

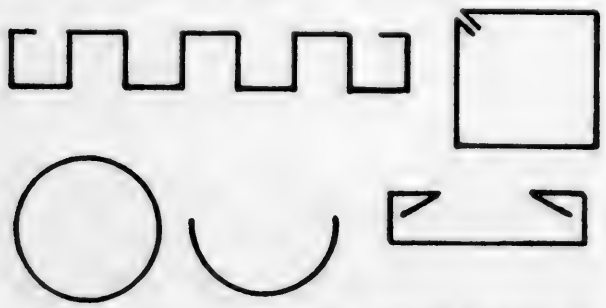
Diameters range from 6 to 45 inches, containing from 9 to 685 ⅞-inch ID impervious graphite tubes. Standard tube lengths are 6, 9, 12, 14, and 16 feet. A total of 77 separate combinations of tube bundle diameter and tube length covers a range of from 17.7 to 3,585 sq ft of heat transfer surface on the outside of the tubes.

Graphite equipment is said to be completely corrosion resistant, immune to thermal shock, free from metallic contamination, and has high thermal conductivity. Illustration shows two 45-inch heat exchangers nearing completion.

More information? Circle Item 30, postcard, last page.

Metal Bending Brake

Simple design, welded steel construction for strength and rigidity, ease of operation, quick adjustment, and versatility are features of the Double Apron metal bending brake available from P. L. Cady, Darien Center, N. Y. The machine is claimed to be unmatched for single



pieces or quantity runs for any bending operation on sheet metal up to 18 gage. Very little experience is required to do fast and accurate work.

The double aprons allow forming of sections, some examples of which are illustrated, asserted by the company to be impossible on any other hand brake made. The machine successfully competes with press brakes at much less expense. It forms entirely without the use of dies any angle bend up to 155 degrees.

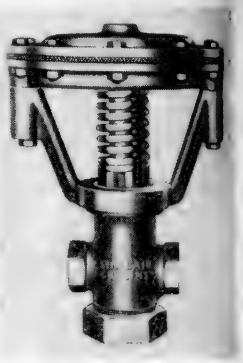
Radius bends are formed anywhere in the sheet and from the very edge, with no flat areas. Savings can be realized on many jobs by the elimination of one or more joints as the material can clear the machine by passing over the upper hold down.

More information? Circle Item 31, postcard, last page.

High Temperature Hot Water Valves

A full line of diaphragm-operated control valves, with ductile iron bodies for use with high pressure, high temperature hot water, is announced by Sinclair-Collins Valve Co., Akron, Ohio.

S-C ductile iron valves are suitable for hot water service at pressures up to 600 psi and temperatures as high as 350 deg F. The ductile iron used in the bodies of these valves is reputed to be much more corrosion-resistant than steel and has a tensile strength approximately three times that of bronze. Hardened stainless steel stem and replaceable seat inserts assure long, leak-free service, and skirted seat rings are said to resist wire drawing.



These 600 lb ductile iron valves are offered in 2-way, 3-way normally open or normally closed, and reverse acting types. Sizes range from ½ to 1½-inch NPT. Top diaphragm, actuated by 20 to 35 psi air, can be operated by the company's cycle controller, any applicable pneumatic or electro-pneumatic cycle control device, or manually.

More information? Circle Item 32, postcard, last page.

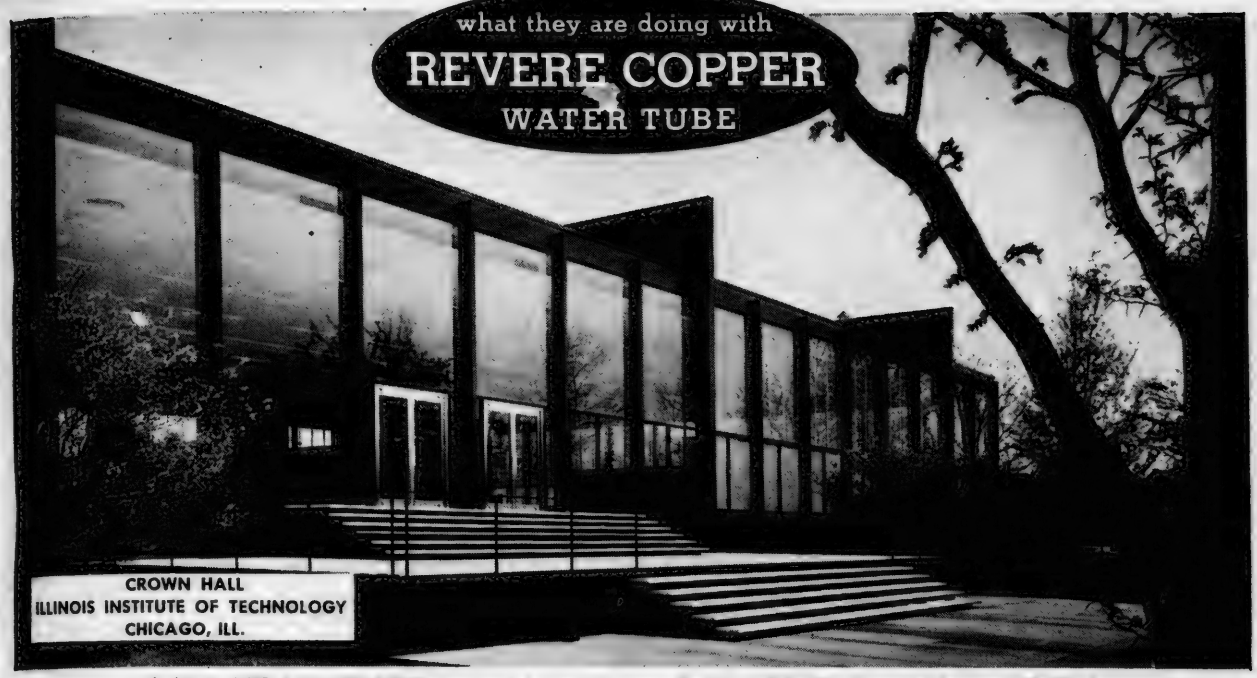
Operations Recorder

Available from Gorrell & Gorrell, Westwood, N. J., is a drum-type operations recorder which shows graphically when and how long a device, machine, or person is operating. When placed on individual machines, operations records are easily and accurately obtained for production and cost studies. Used in research, development, product testing, and with leased services of many types, units are suitable for operations-timing of oil burners, pumps, and air conditioning systems.

The drum-type recorder utilizes a slightly spiral tracing to give drum rotation at various single speeds from 4 min to 24 hr with chart capacities from 160 min to 40 days. Stylus moves uniformly ⅛ inch with each drum rotation. 534 linear inches of recording is provided on an easily filed, 6 by 14-inch chart. Plastic transparent housing permits continuous tamper-proof observation of tracing. Motor and stylus magnet normally operate from 115 volts, 60 cycles although other voltages may be specified.

More information? Circle Item 33, postcard, last page.

(Continued on page 108)



Architect: MIES VAN DER ROHE. *Associate Architect-Engineer:* PACE ASSOCIATES. *Structural Engineer:* FRANK J. KORNACKER. *General Contractor:* DAHL-STEDMAN COMPANY. *Landscape Architect:* ALFRED CALDWELL, all of Chicago.

UNIQUE SPLIT SYSTEM meets air change requirements and at the same time gives occupants the many benefits of RADIANT PANEL HEATING

In this split system, ventilation ducts in the ceiling provide the necessary air changes per hour as required by the Chicago Building Code. In the winter the air is heated, supplemented by the radiant panel system in the floor. The warm air system carries the principal heat loss while the radiant panel system offsets the heat loss of the large glass areas.

Revere Copper Water Tube was used for radiant heating panels because the standard 60' lengths mean fewer fittings, the sure soldering of copper means tight joints and its non-rusting qualities mean no clogging or reduction of flow. In addition, contractors are finding out that when properly applied, copper water tube not only is dependable and easier to work, but actually *costs less* than rustable materials.

The inherent qualities of Revere Copper Water Tube also make it the first choice for hot and cold water lines, underground service lines, processing lines, drainage and waste lines, vent stacks. See your Revere distributor for your needs.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales offices in Principal Cities, Distributors Everywhere.

COPPER ★ BRASS ★ 1801 ★ REVERE ★ ALUMINUM

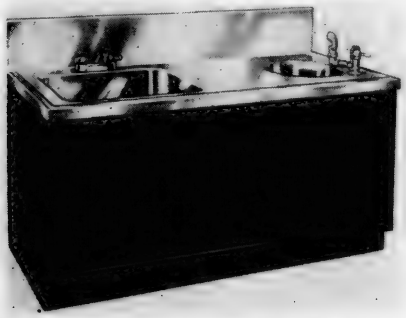
13,580 FEET OF TYPE "L" Revere Copper Water Tube were supplied the Heating Contractor, CHICAGO CONDITIONAIRE COMPANY by the Revere Distributor, COLUMBIA PIPE & SUPPLY CO., both of Chicago.

AN IDEAL HEATING COMBINATION—Air ducts in the ceiling and radiant panel heating coils in the floor. Note that, due to greater heat loss, panels near the windows are spaced on 12" centers, while the remainder are on 24" centers.

(Continued from page 106)

All-Steel School Equipment

Its 1958 line of Grade-Aid school equipment is announced by School Equipment Mfg. Corp., Nashua, N. H., subsidiary of The Maine Mfg. Co. Line includes all steel mobile classroom units: sinks, wall cabinets, counters, and wardrobes.



Modular design permits maximum utilization of classroom space and simple rearrangement of units to meet changing space requirements. Sink units, as shown, are available with Melamine plastic or stainless steel tops.

More information? Circle Item 34, postcard, last page.

Socket-End PVC Valve

In response to growing acceptance of polyvinyl chloride as a corrosion-control material, Lunkenheimer Co., Cincinnati, Ohio, announces the addition of a valve with socket ends to its line of Luncor PVC valves.

Designated Fig. 2601, the valve is rated at 125 psi and 140 deg F, identical to the Luncor Fig. 2600 valve with screw ends.

Socket-end valve is readily installed in PVC pipe lines by solvent welding. This is a fast and easy method of connecting PVC valves to pipe, and produces high joint strength.

More information? Circle Item 35, postcard, last page.

Two-Person Washfountain

Redesigned by Bradley Washfountain Co., Milwaukee, Wis., the Duo-Washfountain is more attractive in appearance, stronger and firmer in construction, and easier to install. There is no scuff base at bottom so that when the hinged and larger foot-treadle is flipped up, cleaning of floor underneath is easily accomplished. A touch of the foot controls the water served by the sprayhead which replaces faucets.

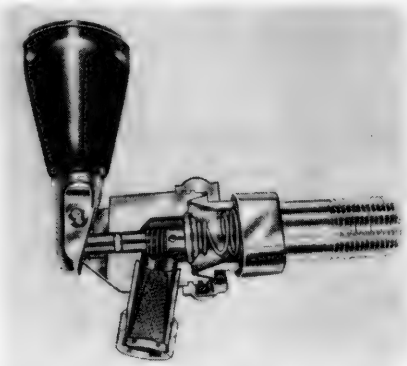
The large sanitary two-person bowl is self-flushing, preventing collection of used water. These bowls are of stainless steel or pressed steel, finished in acid-resisting vitreous enamel, with choice of white or five colors.

Standard height from floor to rim of bowl is 31 inches; 27 inches is height for juveniles. Savings in space and piping connections for equivalent washing facilities are other advantages claimed by the company.

More information? Circle Item 36, postcard, last page.

Stainless Dispensing Faucet

An improved corrosion-resistant faucet constructed of 303 stainless steel with Teflon O -ing seals is made available by Eco Engineering Co., a division of Economy Faucet Co., Newark, N. J. It is designed to dispense corrosive and flammable fluids.



Faucet provides both fluid and vapor-tight seals over a wide temperature range. Sealing is accomplished by internal system pressure which eliminates seizure problems that are prevalent in mechanically pre-loaded dispensing equipment.

More information? Circle Item 37, postcard, last page.

Liquid Plastic Sealant

Breakdowns in mechanical equipment caused by loose nuts and bolts can now be eliminated with a liquid lock washer, available from American Sealants Co., Hartford, Conn. Called Locktite sealant, this liquid plastic sets up nuts and bolts so securely that no amount of vibration will shake them loose, yet they can be removed with ordinary tools. It replaces lock washers and lock nuts, giving up to five times the removal torque of these devices.

A thread locking kit of Loctite sealant has been especially designed for use in maintenance and service and repair work. This kit contains five plastic squeeze bottles of sealant, each with a handy dispensing nozzle, so that it can be applied right to the assembled bolt or nut.

In addition to its use of lock nuts and bolts against vibration, the properties of this sealant make it suitable for sealing joints or porous welds in piping and process equipment against leakage. Maintenance and installation work on gas lines, oil burners, and ordinary plumbing can benefit by use of the sealant.

More information? Circle Item 38, postcard, last page.

(Continued on page 110)

REVOLUTIONARY *new* HEATING FOR BUILDINGS

IRON FIREMAN SelecTemp®

a thermostat in every room

When every room is a separate heating zone, many of the problems that a conventional system can't touch are solved automatically . . . and with the SelecTemp heating system, they are solved economically. For example:

1. Tenant satisfaction is assured because occupants have independent control of room temperatures. They select the temperature they want.
2. Rooms are always comfortable, whether on the cold or warm side of the building, because the ever alert mechanism in each unit automatically adjusts for extra heat loss or gain, and supplies the right amount of heat needed at the right time and in the right place. Each unit takes care of its own room no matter how conditions may vary in other parts of the building.
3. Owners report substantial fuel savings because room-by-room control does away with overheating. *Heat is not wasted through open windows.*
4. The SelecTemp heating system can be economically installed in either new or existing buildings. Operating costs are low. Money can also be saved by heating only the rooms in use. The temperature can be lowered in rooms temporarily unused—then when these rooms are needed, they can be quickly reheated.

For cooling. Individual unit cooling combined with SelecTemp heating is the perfect combination for year 'round comfort, with room-by-room control of both heating and cooling.

Send for free literature. Iron Fireman will gladly send you a free booklet describing the SelecTemp heating system. Get all the facts—fill out the coupon below.

MORTON SALT COMPANY CUTS FUEL COSTS 57%

Manager of Wadsworth, Ohio office writes:

"Our former steam system was controlled by one master thermostat. We had room-heat fluctuations from 5 degrees to 25 degrees in the general office and in seven enclosed offices, resulting in absenteeism loss of 343½ working hours, because of illness due to colds. With SelecTemp heating during the season just ended we had absenteeism loss of only 75 hours.

The cost for heating in the 1954-1955 season was $1,361.13. Our cost for SelecTemp heating in the colder, longer 1955-1956 season was $586.25 or an actual saving of $774.88. However, we have had some increases, ie: Increased comfort, increased employee morale and increased attendance."

S. A. Carlson
Office Manager

Small, compact units

Only 18 inches high, the SelecTemp units are recessed in walls; take no floor space. Each unit complete with its own thermostat, air filter, heat exchangeer and steam driven fan. Steam is supplied by a low pressure boiler, fired by oil, gas or coal, or from district steam lines. Units can be painted to match walls.

IRON FIREMAN.
Engineered
HEATING AND COOLING

IRON FIREMAN MANUFACTURING CO.
3357 West 106th Street, Cleveland, Ohio.
(In Canada write to 80 Ward Street, Toronto)

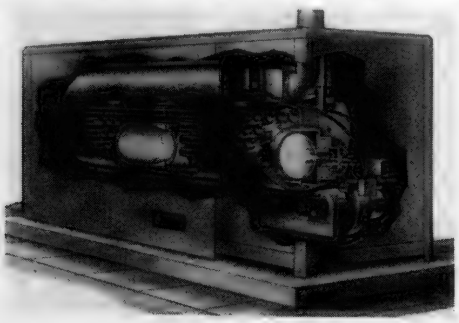
☐ Send SelecTemp specifications and full information.
☐ Arrange for brief demonstration of SelecTemp room unit, in actual operation, in our office.

Name_____
Firm_____
Address_____
City_____ Zone____ State_____

(Continued from page 108)

Oil-Fired Packaged Boiler

Field-tested for two years during which its efficiency was proved, a space-saving automatic oil-fired packaged unit capable of delivering the heat required plus 480 gph of domestic hot water has been added to the Dynatherm line of Bethlehem Foundry & Machine Co., Bethlehem, Pa.



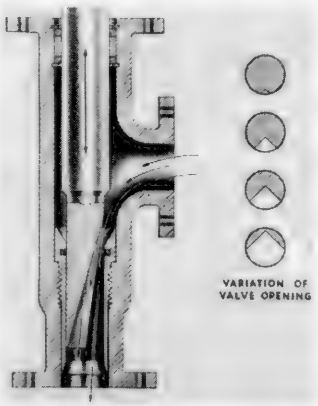
The company developed the unit, Model 100, to meet the needs for heating and hot water required in unusually large homes, motels, apartment houses, churches and commercial garages.

Tests made by heating engineers indicate that the model used 40% less fuel than the heating systems they replaced during the field testing. The heating plant is enclosed in a baked enamel cabinet standing 41 inches high, 31 inches wide and 78 inches long.

More information? Circle Item 39, postcard, last page.

Liquid, Gas Flow Control

The Tapered Orifice valve, available from General-American Valve Co., Corona Del Mar, Calif., offers a new concept of flow control. By moving a plug with a tapered slot into and out of a circular opening, the flow of fluid or gas is controlled by the area of the tapered slot at the head of the opening. A circular sealing ring eliminates by-pass.



The function of the valve is basically that of a needle valve, but by concentrating all of the flow area in one triangular section instead of around an annular ring, it is virtually clog-proof. In the nearly-closed positions, for instance, it will pass foreign particles twenty times larger than a comparable needle valve.

Its principle advantages are high accuracy, infinitely variable control, non-clogging, non-freezing, abrasion-resistance, and excellent coefficient of flow at all settings with very low turbulence.

Thoroughly field tested, the valve is available in many sizes, pressure ranges and connections. Special design problems will be handled by the company.

More information? Circle Item 40, postcard, last page.

Time Switch for Fuel Firing

Model 6191 time switch, by Tork Time Controls, Inc., Mount Vernon, N. Y., is designed for use on heavy oil or coal stoker installations. A fast-dial time control, it provides one or more *on* and *off* periods, automatically, every hour.

In heavy-oil installations, short hourly warm-up periods, during night shut-down, pre-heat heavy oil for quick morning start-up. Usually, a 10-minute warm-up every hour is sufficient. If two *on* periods are required every hour, they may be scheduled by setting an extra pair of trippers on the dial.

In coal stoker installations, the *on* action serves as a hold-fire, maintaining a fire bed throughout the night. Five minutes *on* out of every 30 minutes is usually enough for hold-fire. The length of warm-up or hold-fire may vary with conditions of the installation, but ease of setting schedules eliminates maintenance problems.

More information? Circle Item 41, postcard, last page.

Stainless Solenoid Valve

Series 2000 two-way stainless steel solenoid valves rated to 6000 psi and designed for use with any media are offered by Atkomatic Valve Co., Inc., Indianapolis, Ind.

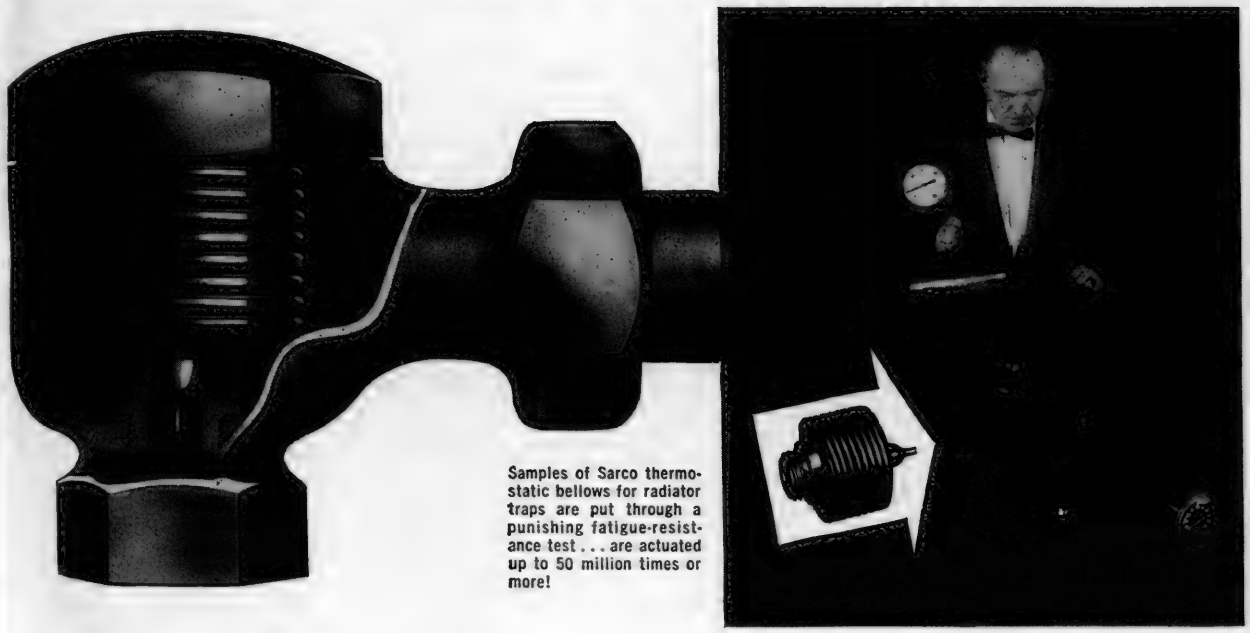
Valves are available in 1/8, 1/4, 3/8, and 1/2-inch pipe sizes. Explosion-proof housing can be supplied, as well as bubble-tight construction where desired for leak-proof operation for such elusive gases as hydrogen and nitrogen.

More information? Circle Item 42, postcard, last page.

(Continued on page 112)

50,000,000 cycles can't be wrong!

How Sarco guarantees "on-the-job" performance of Thermostatic Radiator Traps



Samples of Sarco thermostatic bellows for radiator traps are put through a punishing fatigue-resistance test . . . are actuated up to 50 million times or more!

This is the most gruelling test a thermostatic radiator trap could possibly get. It's a thermostatic bellows test that goes on endlessly . . . day after day, year after year . . . in the Sarco Research Lab.

In this Sarco research and product development work, thermostatic bellows for Sarco radiator traps are expanded and contracted 50,000,000 times or more to test and study their fatigue-resistance!

Further to assure you the utmost on-the-job dependability, production samples of Sarco thermostatic bellows are tested to *10 million cycles* and more!

OTHER IMPORTANT ADVANTAGES

Extra-strong union nut and nipple — made of bar stock, not just brass castings.

Extra-rugged body — insured by *pressure* casting. Eliminates porosity. Maximum insurance against hidden defects.

Every body pressure-tested at maximum rated steam pressure.

Removable seat — for easy replacement. Seat and self-aligning valve head made of hard bronze.

ASK FOR BULLETIN 150

FOR UNDIVIDED RESPONSIBILITY on your installations, it pays to specify and order from one "Complete Line" source . . . SARCO-THERM. Write for catalogs—to Sarco Company, Inc., 635 Madison Avenue, New York 22, N. Y.

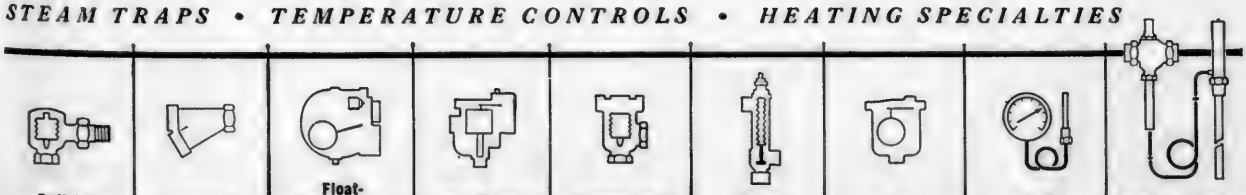
2213-B

SARCO

AN AFFILIATE OF SARCOTHERM CONTROLS, INC.

Products you can rest your reputation on

STEAM TRAPS • TEMPERATURE CONTROLS • HEATING SPECIALTIES

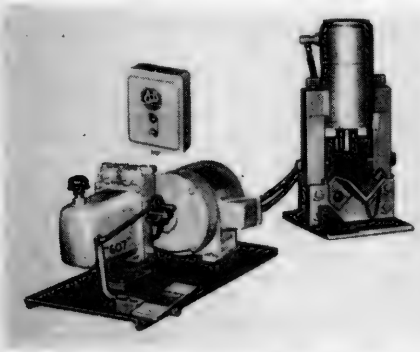


Radiator Valves • Traps | Strainers | Float-Thermostatic Traps | Camlift Bucket Steam Traps | Thermostatic Traps | Water Blenders | Air Eliminators | Dial Thermometers | Self-Operated Temp. Reg.

(Continued from page 110)

Small Shear Cuts Big Stock

Model 607 hydraulic angle-iron shear, only 26 inches high with 18-tons capacity is offered by W. A. Whitney Mfg. Co., Rockford, Ill. It shears stock up to 4 x 4 x ¼



inches, bends flat mild steel 6 x ⅜ inches, and may be used on floor or bench.

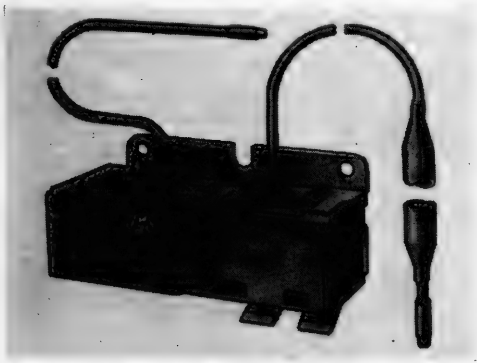
Mitering attachments, included at no extra cost, allow faster production. Operation is by foot treadle.

More information? Circle Item 43, postcard, last page.

Heat Pump De-Icer Control

Models D50 and D52 de-icer controls, designed to serve as part of the automatic control-and-valve system of a heat pump, have been introduced by Ranco Inc., Columbus, Ohio.

Used in conjunction with company's V25 and V26 slide-type reversing valves and C17 control which actuates the system according to temperature demands in both heating and cooling cycles, operation of the control is based upon increases of temperature differential between



outside ambient air and outside coil temperature when an ice blanket is formed on the coil as compared to a clear coil.

Two capillary tubes make possible mounting in a weather-protected chamber with the tubes extending outside the compartment, one in the ambient air stream, the other with a sensing bulb for attaching to an end bend at the middle of the outside coil. De-icing occurs as the sensing bulb and the ambient air capillary react to the lowered temperature of refrigerant in the outside coils and the ambient air stream during the heating phase. A rocker arm in the control opens the switch which stops the outside fan and causes a slide-type reversing valve to position for transferring heat from the unit to the outside coil. Ice is completely removed in 3-5 minutes, the temperature increase expands the sensing bellows, closes switch and terminates the de-icing cycle. Unit then is automatically in the heating phase.

More information? Circle Item 44, postcard, last page.

Stainless Submersible Pump

A submersible pump whose exposed parts are made of 302 stainless steel is manufactured by R. S. Corcoran Co., Joliet, Ill.

It is completely submersible, has an automatic switch which turns on when water reaches a depth of 8 inches or any pre-determined depth. It shuts off when water is completely pumped from sump. It is 12 inches high,

including handle and 6½ inches in diameter, has 1¼-inch IPS discharge, ⅓-hp, 120-volt Westinghouse motor. Switch is completely enclosed and UL approved. Capacity: 50 gpm at 6 ft lift.

Pump can be adapted for use in the following: sumps, basement, tanks, elevator pits, excavation, boiler-room pits, swimming pools and boats.

More information? Circle Item 45, postcard, last page.

In-Duct Smoke Indicator

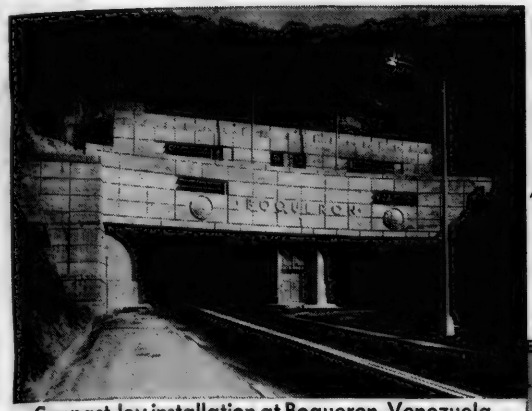
System FE-3 Fireye photoelectric smoke density indicator and recorder is available from Electronics Corporation of America, Cambridge, Mass. It accurately measures, indicates, and records smoke density in any duct or breeching that is pressurized. Pressure sealing flanges are provided to seal the sighting tubes on which the light source and scanner are mounted.

Continuous monitoring of smoke discharge and overall indication of combustion efficiency is provided. It helps to keep smoke discharge within limits of all smoke control and air pollution ordinances. Light source and scanner are installed on the stack or breeching so that light beam is aimed directly at the lens of the scanner. An alarm relay operates an external alarm at any preset value of smoke density.

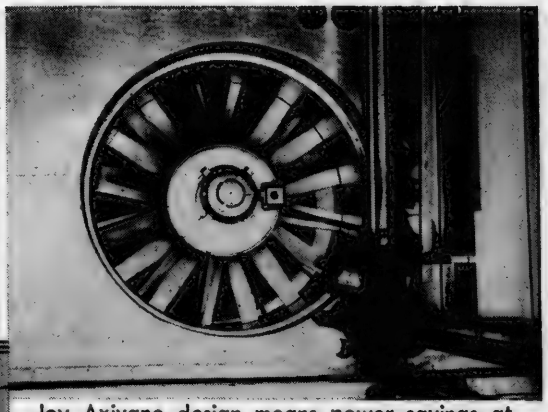
More information? Circle Item 46, postcard, last page.

(Continued on page 114)

Ventilation Problems: Gone with the Joy Axivane Wind



Compact Joy installation at Boqueron, Venezuela, moves huge quantities of air.



Joy Axivane design means power savings at Alcoa's Texas Plant.

Space-saving Joy fans are installed as part of the duct system at Reliance Electric's Ohio Plant.

Dependable Joy installation circulates freezing air in California Cold Storage Plant.

'Round the World, JOY Handles the Hard Ventilating Jobs

If you have a really tough ventilating job coming up . . . moving large volumes of air . . . variable pressures and volumes . . . unpredictable resistance . . . cramped space allotment . . . better take a look at the Joy Axivane Fan.

Compact design, with the motor *inside* the fan gives you more air per pound of fan and motor . . . more air per cubic foot of fan. The straight-thru design allows you to install it right *in* the duct; becomes a *part* of the duct; eliminates offsets, elbows, drives and guards.

Pre-lubricated, double-shielded ball bearings permit the fan to be installed in *any* position. Adjustable blades allow for unpredictable resistance . . . permit changes in volume or pressure, *after* the fan is installed.

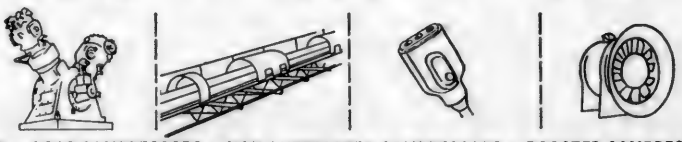
You choose from a standard line of over 136 models . . . and still have the advantage of Joy's custom engineering service. Joy Axivane Fans can make your next ventilating job a lot easier . . . that's one reason why Joy gets the tough assignments.

Get complete information about Joy Axivane Fans from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

WSW 15840-17

WRITE FOR FREE BULLETIN 17-40

JOY . . . EQUIPMENT FOR INDUSTRIAL PLANTS . . . FOR ALL INDUSTRY

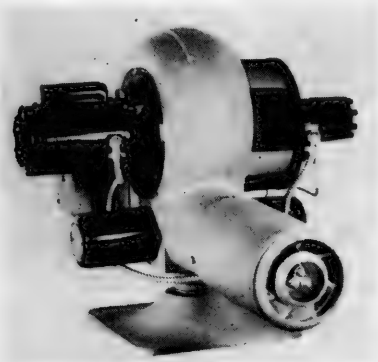


STATIONARY AIR and GAS COMPRESSORS • NON-LUBRICATED COMPRESSORS • BOOSTER COMPRESSORS VACUUM PUMPS • PORTABLE COMPRESSORS • INDUSTRIAL FANS • PORTABLE BLOWERS • FOUNDATION BREAKERS • HOISTS • ELECTRICAL PLUGS, RECEPTACLES and POWER DISTRIBUTION SYSTEMS

(Continued from page 112)

Shell Head Oil Burner

Model T-4SH-16 shell head oil burner, rated at 8.0-20.0 gph, is the fifth size to be introduced by Eckhart Mfg. Co., Inc., Union, N. J., within the past two years, extending its Korth line to include capacities from 0.75 to 20.0 gph.



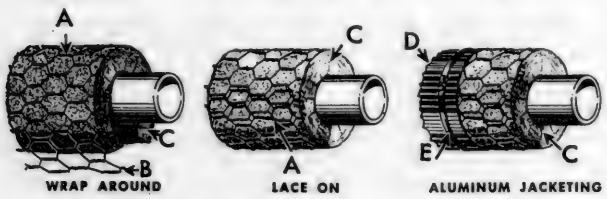
Improved shell designed combustion head has all air adjustments made externally. Unit has twin ignition, two transformers, three nozzles. Factory mounted delayed oil valve and the latest Minneapolis-Honeywell electronic safety control system are featured.

More information? Circle Item 47, postcard, last page.

Lace-On Pipe Covering

A segmental laced-on pipe covering for process piping is announced by Forty-Eight Insulations, Inc., Aurora, Ill. Called Copr-fibre, it is a felted mineral insulation for one-piece application as shown in illustration.

Insulation (C) with metal mesh facing (A) is applied.



Lacing edge lap (B) is shown. Material can be jacketed (D, E) with aluminum or galvanized sheet metal. Recommended temperature range is from 100 to 1200 deg F for 2 to 14-inch and larger pipes. Thicknesses from 1 to 5½ inches are available. *K* is 0.26 at 100 deg. Insulation is chemically neutral, moisture resistant, stable, incombustible, and will not cause or accelerate corrosion, company states. Catalog contains specs and application data.

More information? Circle Item 48, postcard, last page.

Incombustible Building Board

A new, lightweight, and completely incombustible building board called Asbestolux is being marketed by North American Asbestos Corp., Chicago, Ill.

The board is composed entirely of inorganic material and therefore is resistant to fire, heat, rot, mold, and vermin. The material is formed of a long fiber asbestos known as Amosite which is bonded chemically with a special silica in a high pressure steam process. The resiliency, strength, and length of the asbestos fibers in the material contribute to its lightness and workability.

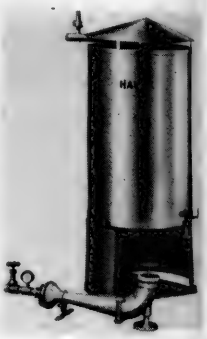
In addition to its superior fire resistance, the board is a prime insulating material, thermally and electrically. It serves as a thermal barrier for processes involving intense heat and its high dielectric strength has promoted its use both as an electrical component and as a protective material for electrical processing. One third the weight of good quality cement asbestos boards and five times greater in insulating value, the material can be sawed, nailed, or fastened with screws as easily as wood.

More information? Circle Item 49, postcard, last page.

Portable Water Heater

Hauck Manufacturing Co., Brooklyn, N. Y., has developed and placed on the market a portable gas heater which delivers large quantities of hot water required in general building, paving, ready-mix concrete producing and other operations. It eliminates need of a costly boiler, and can be readily moved by a small crew of men.

This water heater has conical steel coils of 1-inch seamless steel tubing and is fitted with recirculation to provide steady, uninterrupted supply of hot water to 190 deg. F. Model 301G, single coil type, heats 1250 gph with a 50 deg rise, or 450 gph with a 140 deg rise. Model 312G, double coil type, heats 1660 gph with a 50 deg rise, or 600 gph with a 140 deg rise from inlet temperature. Thermostatic control can be provided.



The burner utilizes LP gas, propane or butane and can be arranged also for natural, manufactured or mixed gas. Its design assures high heat output and close flame control, with instant turn-down for small hot water supply requirements by the turn of a single burner valve, without removing the burner from underneath the heater.

More information? Circle Item 50, postcard, last page.

1958 Through-the-Wall Units

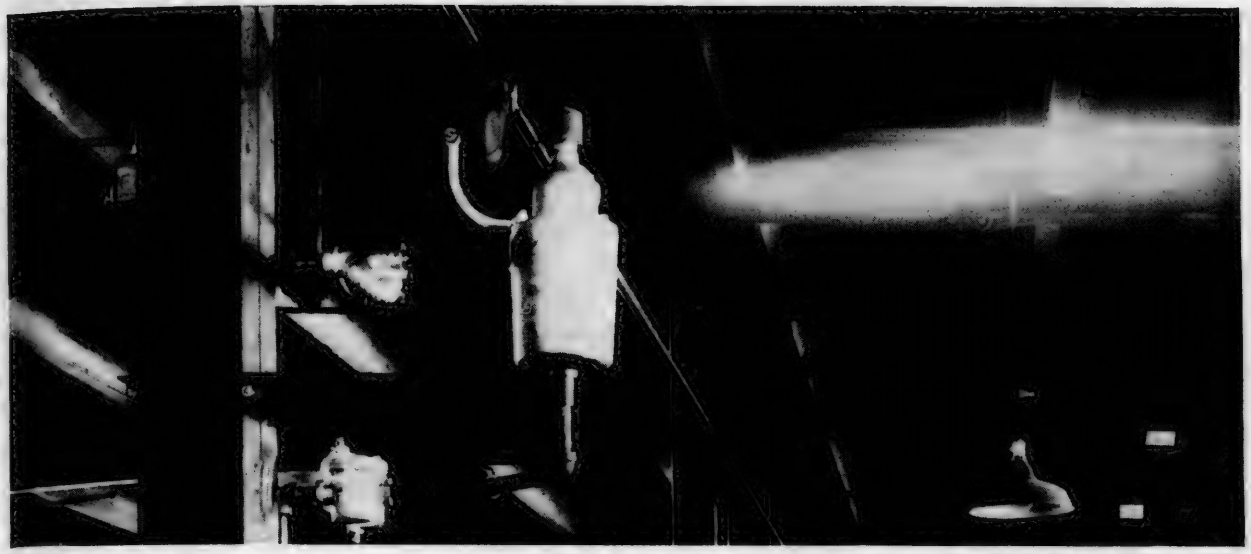
Ten models are included in the 1958 line of through-the-wall air conditioners announced by Fedders-Quigan Corp., Maspeth, N. Y. Their capacities range from ¾ to 1½ hp. Units will be shipped either complete with chassis and shell, or chassis and shell separately for the building market.

Also announced are a line of room air conditioners that includes a 1½-hp model that operates on 115-volt house current, and a heat pump unit with a thermostat located on its outside coil that senses frost accumulation to permit operation below freezing temperatures.

More information? Circle Item 51, postcard, last page.

(Continued on page 116)

When You Want to Humidify—



Consider the Advantages of ARMSTRONG *Steam* Humidifiers —Easy to Install and Maintain . . . Automatic, Accurate Control

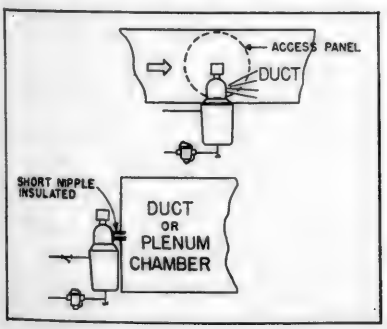
Whether you want to humidify an office for the health and comfort of employees, a rubber cement plant to prevent the hazards of static electricity, or a church to protect the pipe organ...Armstrong can help you do it better—and at less overall cost—with steam humidifiers.

They discharge steam directly into the room or into ducts or plenum chambers—either way you get large capacity at low cost. For explosive atmospheres, there are air-operated models. What's more, there's no mineral "dust" to settle onto employees and equipment.

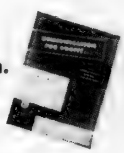
Control is really accurate—relative humidity is held within 2 to 4% of setting. The steam disperses quickly and the sensitive humidistat responds quickly to slight changes in humidity.

Maintenance is almost a forgotten word with these units. There's nothing to clog the valve or scale up the inside. Solenoid coils are glass wound. Valves and humidistats last indefinitely; fan motor bearings are lubricated for life.

There are other advantages, too. No damp spots—the unit has a steam jacketed inner chamber which evaporates condensation; the steam carries no water droplets. Effect on air temperature is negligible. No odor—pure steam is odorless. Quiet operation — unit is acoustically designed.

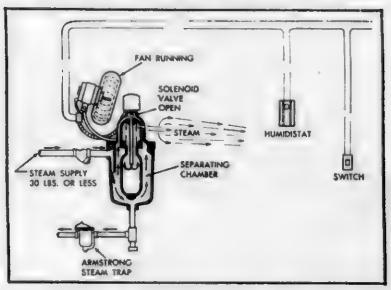


BULLETIN No. 500
gives complete information. Tells:



- How relative humidity affects profits, health, comfort and safety.
- Why steam is best for humidification.
- How users of Armstrong Steam Humidifiers profit.
- How to select and install units.
- Complete physical data and prices.

Send for your free copy today! Call your local Armstrong Representative, or write:



HOW THEY WORK

When humidistat calls for moisture, solenoid steam valve opens and fan starts. Steam enters separating silencing chamber, then goes to atmosphere. When humidity reaches desired level, valve closes and fan stops.

NEW!

Automatic, controlled evaporative-type central humidifier

. . . the HUMID-I-MAKER

Air is blown across surface of heated water and into central duct. No mineral dust. High capacity. For use with hot water, steam and warm air heating systems — in homes, offices, greenhouses, schools, etc.

Bulletin No. 9001 gives complete information—write today.

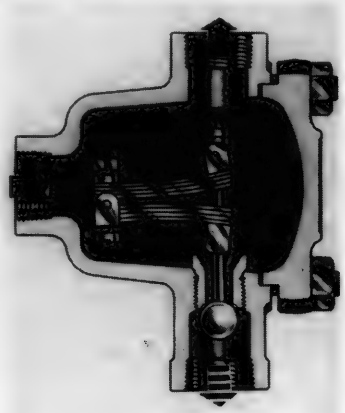
ARMSTRONG MACHINE WORKS
8468 Maple Street • Three Rivers, Michigan

SATISFACTION GUARANTEED

(Continued from page 114)

Freeze Protection for Condensate

Addition to its line of a safety device to protect condensate lines in cold weather, where temporary pressure failure can mean freeze ups, is announced by Velan Steam Specialties Inc., Plattsburg, N. Y.



Freeze protector consists of a bi-metal element in a forged steel body with all stainless steel trim and stellited valve seat. It is installed in the low points of return mains or before risers and the normal temperature of the condensate keeps the valve closed. In the event of boiler pressure failure or line blockage, the resulting temperature drop will cause the element to open the valve to atmosphere at a predetermined temperature of 90 to 120 deg F. The ½-inch orifice has sufficient capacity to drain the lines quickly before freezing can take place.

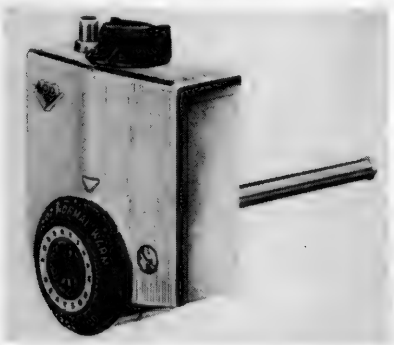
This method of line protection at a minimum of initial cost can save untold amounts of money by preventing costly freeze ups in any condensate system exposed to freezing.

Protector is installed in the line as a standard pipe fitting with no additional piping required and is stocked in ½, ¾, and 1-inch connections with larger sizes also available on request.

More information? Circle Item 52, postcard, last page.

Water Heater Control Improved

Several design improvements are announced by Grayson Controls Div., Robertshaw-Fulton Controls Co., Long Beach, Calif., in its Unitrol 400 three-in-one control for gas-fired water heaters.



A high-style appearance has been achieved by changing the ribbing on the control's silver cover plate to extremely thin-line corrugations. The large temperature control knob is now sloped at an angle so that temperature settings are readily visible from a standing position when the control is mounted at the base of the water heater. Both the temperature knob and the automatic pilot switch are in black plastic. Gold lettering further highlights the operating instructions. Also, operation of the temperature knob was changed so that it remains flush with the cover plate as it turns.

More information? Circle Item 53, postcard, last page.

Water Shock Arrestor

A low-cost shock arrestor which absorbs peak shock pressures of water hammer is available from Manufacturers Corporation, Mansfield, Ohio.

A series of sealed Neoprene balls are encased in a length of company's rigid plastic pipe. As the abnormal pressures built up by fast-closing valves hit the arrestor, the

air in the balls compresses, cushioning the shock waves. The arrestor was designed with flexible plastic pipe in mind. Since in many instances the peak pressures of water hammer exceed, by far, the burst strength of flexible polyethylene plastic pipe, some low-cost means had to be found to control these peak pressures and avoid lateral splitting of the pipe.

The casing has a burst strength of well over 2,000 psi at 75 deg F and more than 500 lb at boiling temperature. Thus the arrestors can be used on both cold and hot water lines.

More information? Circle Item 54, postcard, last page.

Hardness-Treated Valve Discs

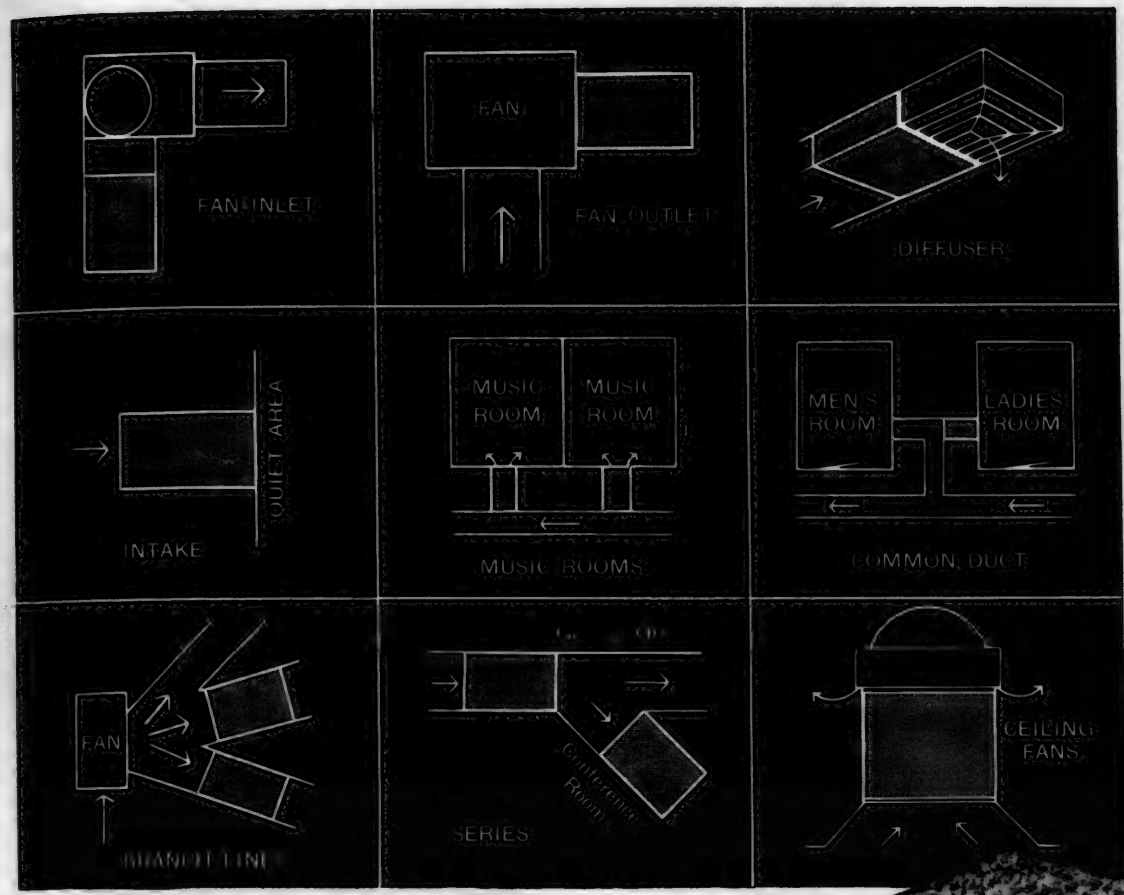
A new development in the treatment of valve discs, which promotes valves into high service brackets, is announced by Kennedy Valve Mfg. Co., Elmira, N. Y.

In exhaustive tests, the company's regular quality valves equipped with treated discs and a new packing material have completed more than 15,000 cycles of operation at 18 ft-lb closing torque on 150 lb saturated steam lines without any signs of failure and without repacking. This test is equivalent to more than ten years of rough use under extreme operating conditions.

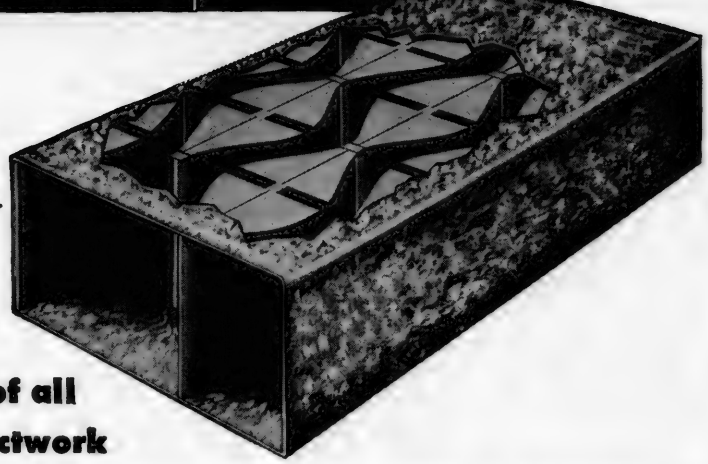
The disc treatment is a new process which deposits a very hard and tough chromium alloy, with a hardness of 70 Rockwell C, on the disc face. The deposit will not crack, flake or peel as ordinary chromium can, the company states. An extremely low coefficient of friction results and the valve seat in service becomes progressively more highly polished instead of galling. Kennedized discs are available in all catalog sizes of the company's bronze body valves for 125, 200, and 300 lb steam rating.

More information? Circle Item 55, postcard, last page.

(Continued on page 118)



Every Building Needs Aircoustat® Sound Traps



AIRCOUSTAT silences all noise of all frequencies traveling through ductwork

Eliminate disturbance, distraction and irritation caused by noises escaping from one area to another through ductwork.

Install AIRCOUSTAT Sound Traps. AIRCOUSTAT eliminates guesswork, wasted space and unnecessary expense of duct lining. You can guarantee your client trouble-free performance. You can estimate with complete confidence the performance of particular applications. If AIRCOUSTAT fits geometrically, it fits acoustically.

AIRCOUSTAT saves you space. Its greater effectiveness permits smaller-sized ducting. It eliminates bulky mufflers.

For more details, write to KOPPERS COMPANY, INC., Industrial Sound Control Dept., 6311 Scott Street, Baltimore 3, Md.

KOPPERS

INDUSTRIAL SOUND CONTROL

Engineered Products Sold with ***Service***

(Concluded from page 116)

Program Controller

Industrial process automation is simplified by receiving, recording, and programming of process variables within a single recorder case made possible by use of a plug-in program controller developed by Bailey Meter Co., Cleveland, Ohio, in conjunction with the company's receiver-recorder.

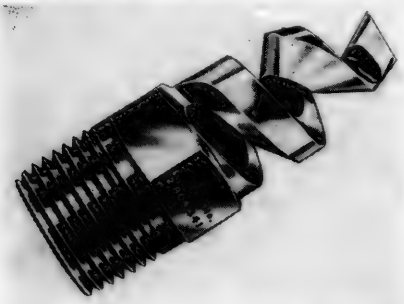
A set-point signal for controlling the process variable is produced in accordance with the shape of a 6-inch dia aluminum cam. This inexpensive cam is chart-printed and easily field-cut to the desired shape. During the programming cycle, one or two precision, snap-action switches for external functions may be operated at specified points as often as desired.

In addition to providing an unlimited variety of programming possibilities, the controller may be set to: (1) repeat full cycle continuously; (2) stop automatically at end of each cycle; or (3) omit or repeat any portion of cycle. Product Specification E99-6 available.

More information? Circle Item 56, postcard, last page.

Pinless Spiral Nozzles

Three series of nozzles are made by Bete Fog Nozzle, Inc., Greenfield, Mass., fabricated from metal, Teflon, and from hard rubber. Nozzles have a spiral element that peels the spray from a solid jet into a spiral sheet



which breaks up into a fine fog. They differ from earlier models in that they are machined from a single solid bar and do not require an internal pin or spreader.

Of the rugged one-piece construction, the new nozzles are suitable for manufacture from an easy-to-machine material, including the softer metals and plastics, for example, nylon, Teflon, hard rubber, and polyvinyl chloride.

More information? Circle Item 57, postcard, last page.

Valves Hold Head Pressure

Series 3246 water regulating valves, available from Penn Controls, Inc., Goshen, Ind., and designed for maintaining uniform refrigerant head pressure regardless of the water temperature returning from the cooling tower, are applicable to commercial refrigeration and air-conditioning systems which may fall well below their rated capacities unless head pressure is maintained within reasonable limits.

Valve provides automatic regulation of water flow to keep the water temperature from falling too low for efficient operation because of low air temperatures at the tower. Three-way action permits water to be diverted from the condenser into a by pass line to the tower nozzles. This eliminates the adverse effect on nozzles or wetting surfaces due to flow restrictions.

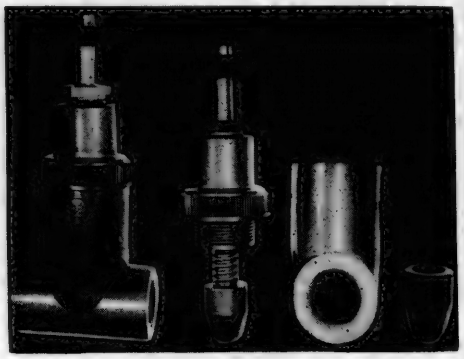
Said to be the first valves operated directly from refrigerant head pressure to be offered for this special service, they are available in ½, ¾, 1 and 1¼ NPT sizes for both R-12 and R-22 refrigerants.

More information? Circle Item 58, postcard, last page.

All-Plastic Gate Valve

An all-plastic gate valve specifically designed to meet the problems of conveying corrosive and abrasive liquids in lines that cannot be chemically contaminated is announced by Vanton Pump & Equipment Corp., Hillside, N. J., a division of Cooper Alloy Corporation.

Called Flex-Plug, it is said to have both the straight-



through flow, non-pressure drop characteristic of a gate valve and the throttling, flow-control feature of a globe valve, allowing for wide versatility of application. Valve is immediately available in 1- and 2-inch sizes with screwed ends. An announcement will be made shortly about the availability of ½- through 4-inch sizes, the company states.

Offered in both PVC, resistant to temperatures up to 140 deg F, and styrene-copolymer (U. S. Rubber Co.), resistant to temperatures up to 170 deg, valve operates by closure of a conically shaped plug with resilient and easily removable synthetic cap on the inside of the body. When fully open, there is no obstruction to flow. When partially open, design of cap and plug allows for minimum turbulence with throttled controlled flow.

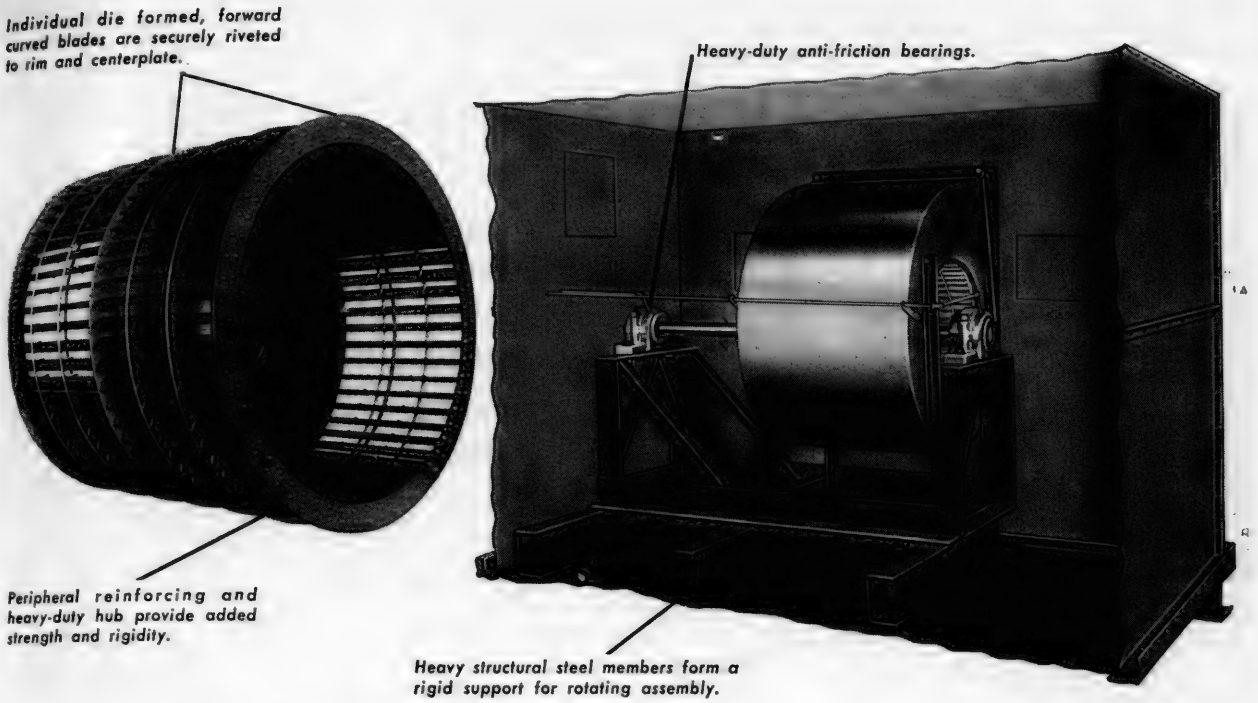
More information? Circle Item 59, postcard, last page.

Quick Acting Shut-Off Valve

A new quick acting shut-off valve for air, water, gas, or oil service is announced by Homestead Valve Manufacturing Co., Coraopolis, Pa.

Known as Figure 202, features of the new valve are said to include positive seating by spring and line pressure; a replaceable resilient disc for positive seal; full opening or closing by 90 deg movement of handle; and cam to hold handle in open position. Made in ⅜, ½, and ¾-inch sizes, Figure 202 is for use on pressures up to 150 psi at temperatures up to 250 deg F.

More information? Circle Item 60, postcard, last page.


Individual die formed, forward curved blades are securely riveted to rim and centerplate.
Heavy-duty anti-friction bearings.
Peripheral reinforcing and heavy-duty hub provide added strength and rigidity.
Heavy structural steel members form a rigid support for rotating assembly.

PROBLEM: High Velocity Air Conditioning Systems—to 8″ SP
SOLUTION: Clarage Hi-Static Multitherm Units

High operating speeds, high duct velocities, high pressures — signal the choice of Clarage Hi-Static Multitherm Units. Available in 7 sizes with capacities from 2,500 to 22,000 CFM.

Unit components on the up-stream side include filters, humidifiers, cooling coils, and heating coils as required. In addition, the Hi-Static can be furnished in a sprayed coil type unit.

As shown above, special care in the design and construction of the fan section insures a stable, smooth operating unit. In every respect the Hi-Static Multitherm has what it takes for high velocity, conduit type air conditioning systems.

Write today for Bulletin 1312. Clarage Fan Co., Kalamazoo, Mich.

CLARAGE ... *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

DEGREE-DAYS FOR SEPTEMBER, 1957

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING'S 30th Year of Publication of Monthly Degree-Day Data

City	September			Season to Sept. 30, incl., from Sept. 1		
	1957	1956	Normal	1957	1956	Normal
Abilene, Texas (A)	6	0	5	6	0	5
Albany, New York (A)	152	262	139	152	262	139
Albuquerque, New Mexico (A)	3	0	10	3	0	10
Alpena, Michigan (C)	245	354	215	245	354	215
Asheville, North Carolina (C)	60	82	50	60	82	50
Atlanta, Georgia (A)	36	5	8	36	5	8
Atlantic City, New Jersey (C)	40	70	29	40	70	29
Augusta, Georgia (A)	19	18	0	19	18	0
Baltimore, Maryland (C)	33	60	29	33	60	29
Billings, Montana (A)	188	140	194	188	140	194
Binghamton, New York (C)	131	223	141	131	223	141
Birmingham, Alabama (A)	24	2	13	24	2	13
Bismarck, North Dakota (A)	264	287	227	264	287	227
Block Island, Rhode Island (A)	67	125	88	67	125	88
Boise, Idaho (A)	65	95	135	65	95	135
Boston, Massachusetts (A)	57	174	77	57	174	77
Buffalo, New York (A)	140	218	122	140	218	122
Burlington, Iowa (A)	97	83	83	97	83	83
Burlington, Vermont (A)	169	298	172	169	298	172
Cairo, Illinois (C)	7	5	28	7	5	28
Charleston, South Carolina (C)	2	3	0	2	3	0
Charlotte, North Carolina (A)	37	46	7	37	46	7
Chattanooga, Tennessee (A)	19	15	24	19	15	24
Cheyenne, Wyoming (A)	284	136	241	284	136	241
Chicago, Illinois (C)[b]	89	72	90	89	72	90
Cincinnati, Ohio (C)	30	50	42	30	50	42
Cleveland, Ohio (A)	97	159	75	97	159	75
Columbia, Missouri (A)	47	31	62	47	31	62
Columbia, South Carolina (A)	20	23	0	20	23	0
Columbus, Ohio (C)	59	94	59	59	94	59
Concord, New Hampshire (A)	167	323	192	167	323	192
Concordia, Kansas (C)	54	41	55	54	41	55
Dallas, Texas (A)	0	0	0	0	0	0
Dayton, Ohio (A)	77	106	74	77	106	74
Denver, Colorado (A)	141	68	120	141	68	120
Des Moines, Iowa (A)	113	103	99	113	103	99
Detroit, Michigan (A)	130	172	96	130	172	96
Devils Lake, North Dakota (C)	340	373	276	340	373	276
Dodge City, Kansas (A)	55	16	40	55	16	40
Dubuque, Iowa (A)	180	173	149	180	173	149
Duluth, Minnesota (C)	357	415	277	357	415	277
Elkins, West Virginia (A)	109	189	122	109	189	122
El Paso, Texas (A)	0	0	0	0	0	0
Ely, Nevada (A)	252	159	228	252	159	228
Escanaba, Michigan (C)	292	345	247	292	345	247
Evansville, Indiana (A)	28	55	59	28	55	59
Fargo, North Dakota	274	291	215	274	291	215
Fort Smith, Arkansas (A)	3	0	9	3	0	9
Fort Wayne, Indiana (A)	140	141	107	140	141	107
Fort Worth, Texas (A)	0	0	0	0	0	0
Fresno, California (A)	0	0	0	0	0	0
Galveston, Texas (C)	0	0	0	0	0	0
Grand Junction, Colorado (A)	55	8	36	55	8	36
Grand Rapids, Michigan (A)	196	197	144	196	197	144
Green Bay, Wisconsin (A)	263	300	183	263	300	183
Greensboro, North Carolina (A)	52	75	29	52	75	29
Greenville, South Carolina (A)	43	43	10	43	43	10
Harrisburg, Pennsylvania (A)	76	146	69	76	146	69
Hartford, Connecticut (A)	123	267	101	123	267	101
Hatteras, North Carolina (C)	(a)	2	0	(a)	2	0
Havre, Montana (C)	204	210	270	204	210	270
Helena, Montana (A)	264	116	320	264	116	320
Houston, Texas (C)	0	0	0	0	0	0
Huron, South Dakota (A)	190	186	149	190	186	149
Indianapolis, Indiana (A)	90	104	79	90	104	79
Jackson, Mississippi (A)	17	0	0	17	0	0
Kansas City, Missouri (A)	29	17	44	29	17	44
Knoxville, Tennessee (A)	23	31	33	23	31	33
La Crosse, Wisconsin (A)	178	187	152	178	187	152
Lander, Wyoming (A)	267	131	244	267	131	244
Lewiston, Maine (O)	187	292	165	187	292	165

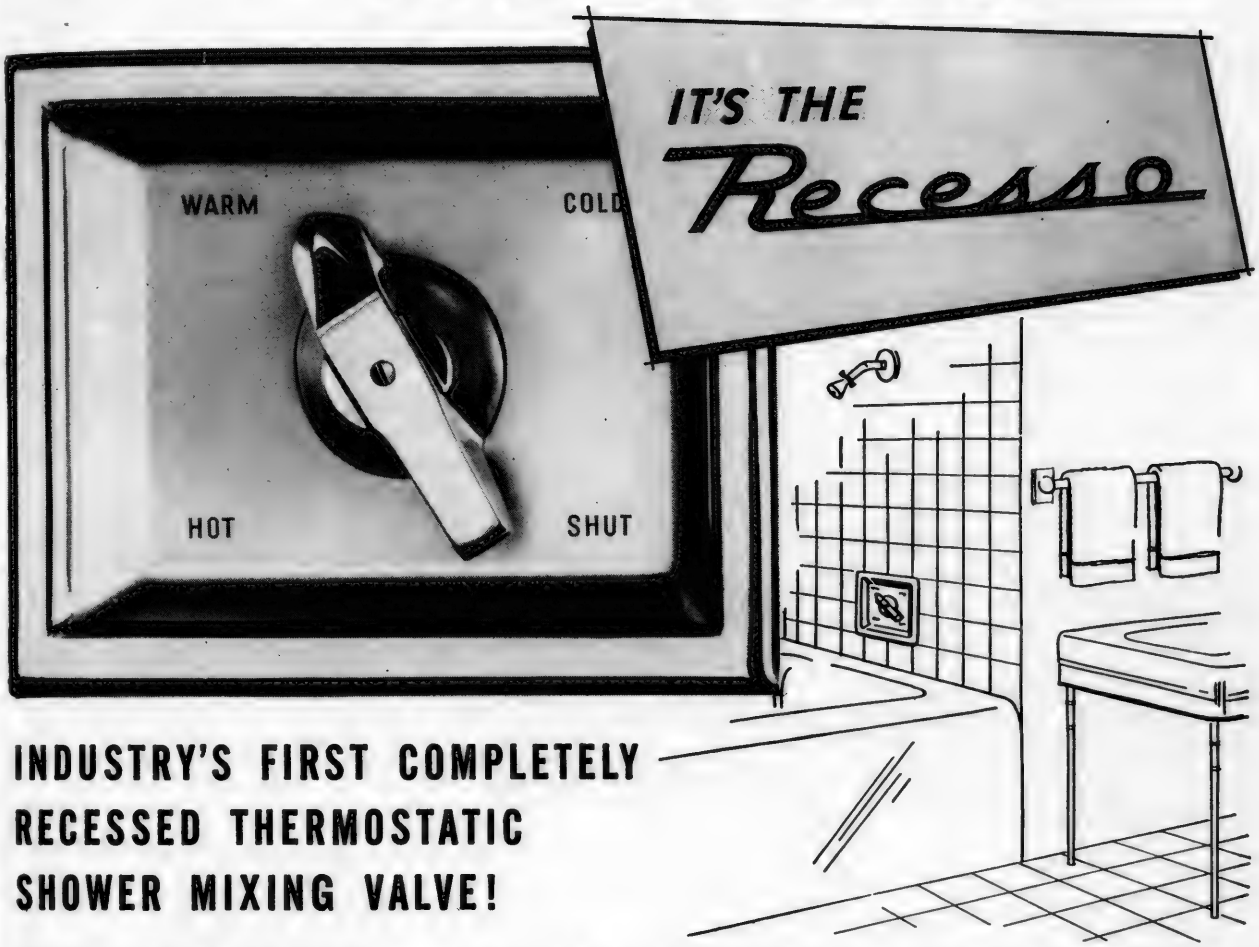
(a) Data not available. [b] 1957 and normal figures are for Midway Airport; 1956 figures are for Grant Park Station.

Normal figures in this table are based on 30-year period covering 1921 to 1950, inclusive, as compiled and published by the U. S. Weather Bureau.

Figures in this table, with two exceptions, based on local weather bureau reports. Exceptions are Utica and Lewiston, figures for which are furnished through the courtesy of Coke Sales Department, Central New York Power Corp., Utica, N. Y., and Norman E. Ross, Bursar, Bates College, Lewiston, Me., respectively. [Table concluded on page 122]

FOR Set and Forget Showers

WITH THE BUILT-IN LOOK!



INDUSTRY'S FIRST COMPLETELY RECESSED THERMOSTATIC SHOWER MIXING VALVE!

PROVIDES BUILT-IN BEAUTY FOR LUXURIOUS SHOWERS!

Designed to go hand-in-hand with today's architectural trends, the RECESSO combines building beauty with rugged performance. It's futuristic styling brings the shower of tomorrow into the bathrooms of today!

NO DANGEROUS PROTRUSIONS!

The RECESSO is completely recessed into the wall. There are no protruding edges to tear or cut. Reduces injuries resulting from shower falls to an absolute minimum.

GREATER SHOWERING COMFORT . . . SHOWERING SAFETY!

New inside as well as out, the RECESSO features a new improved thermostatic valve . . . which provides greater sensitivity. Your customers get more comfortable showering, greater anti-scald protection. Shower automatically shuts off should cold water supply fail.

THE Lawler Line of Thermostatic Control Valves

PERFORMANCE TESTED FOR LONGER LIFE

Steam Temperature Regulators
Thermostatic Shower Mixing Valves
Water Controllers
Tempering Valves

DESIGNERS AND PRODUCERS OF THERMOSTATICALLY OPERATED VALVES SINCE 1895

LAWLER AUTOMATIC CONTROLS, INC., MT. VERNON, N. Y.

Degree-Days for September, 1957 (Concluded)

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

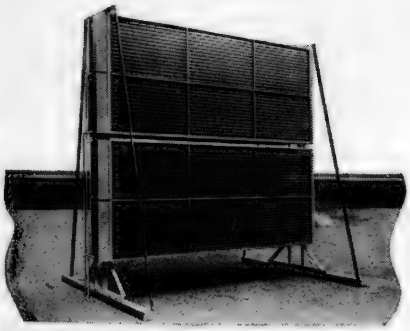
AIR CONDITIONING, HEATING AND VENTILATING's 30th Year of Publication of Monthly Degree-Day Data

City	September			Season to Sept. 30, incl., from Sept. 1		
	1957	1956	Normal	1957	1956	Normal
Lincoln, Nebraska (C)	76	53	79	76	53	79
Little Rock, Arkansas (A)	0	0	10	0	0	10
Los Angeles, California (C)	0	0	17	0	0	17
Louisville, Kentucky (A)	22	63	51	22	63	51
Lynchburg, Virginia (A)	65	92	49	65	92	49
Macon, Georgia (A)	22	5	0	22	5	0
Madison, Wisconsin (A)	197	133	137	197	133	137
Marquette, Michigan (C)	259	362	236	259	362	236
Memphis, Tennessee (A)	6	0	17	6	0	17
Meridian, Mississippi (A)	22	0	0	22	0	0
Milwaukee, Wisconsin (A)	193	188	134	193	188	134
Minneapolis, Minnesota (A)	184	202	157	184	202	157
Moline, Illinois	136	109	96	136	109	96
Montgomery, Alabama (A)	17	0	0	17	0	0
Nashville, Tennessee (A)	10	10	22	10	10	22
New Haven, Connecticut (A)	87	165	93	87	165	93
New Orleans, Louisiana (C)	6	0	0	6	0	0
New York, New York (C)	47	102	39	47	102	39
Newark, New Jersey	54	117	47	54	117	47
Norfolk, Virginia (A)	9	21	9	9	21	9
North Platte, Nebraska (A)	183	120	120	183	120	120
Oak Ridge, Tennessee	(a)	20	0	(a)	20	0
Oakland, California (A)	8	36	76	8	36	76
Oklahoma City, Oklahoma (A)	17	0	12	17	0	12
Omaha, Nebraska (A)	91	78	88	91	78	88
Parkersburg, West Virginia (C)	49	110	56	49	110	56
Peoria, Illinois (A)	70	74	86	70	74	86
Philadelphia, Pennsylvania (C)	40	73	33	40	73	33
Phoenix, Arizona (A)	0	0	0	0	0	0
Pittsburgh, Pennsylvania (C)	64	127	56	64	127	56
Pittsfield, Massachusetts	205	327	213	205	327	213
Pocatello, Idaho (A)	166	138	183	166	138	183
Portland, Maine (A)	184	307	199	184	307	199
Portland, Oregon (C)	10	64	85	10	64	85
Providence, Rhode Island (A)	93	194	107	93	194	107
Pueblo, Colorado (A)	81	19	74	81	19	74
Raleigh, North Carolina (A)	38	58	10	38	58	10
Rapid City, South Dakota (A)	189	119	193	189	119	193
Reading, Pennsylvania (C)	64	127	57	64	127	57
Red Bluff, California (A)	10	0	0	10	0	0
Reno, Nevada (A)	116	116	165	116	116	165
Richmond, Virginia (A)	50	75	33	50	75	33
Rochester, New York (A)	158	239	133	158	239	133
Roswell, New Mexico (A)	10	0	8	10	0	8
Sacramento, California (C)	2	0	17	2	0	17
St. Joseph, Missouri (A)	54	36	49	54	36	49
St. Louis, Missouri (C)	17	17	38	17	17	38
Salt Lake City, Utah (A)	101	58	88	101	58	88
San Antonio, Texas (A)	0	0	0	0	0	0
San Diego, California (A)	0	0	24	0	0	24
Sandusky, Ohio (C)	95	136	66	95	136	66
San Francisco, California (C)	56	91	110	56	91	110
Sault Ste. Marie, Michigan (A)	318	423	298	318	423	298
Savannah, Georgia (A)	3	8	0	3	8	0
Scranton, Pennsylvania (A)	139	241	115	139	241	115
Seattle, Washington (C)	30	147	134	30	147	134
Sheridan, Wyoming (A)	248	159	239	248	159	239
Shreveport, Louisiana (A)	0	0	0	0	0	0
Sioux City, Iowa (A)	133	114	128	133	114	128
Spokane, Washington (A)	106	149	205	106	149	205
Springfield, Illinois (A)	72	65	56	72	65	56
Springfield, Missouri (A)	41	23	61	41	23	61
Syracuse, New York (A)	131	225	117	131	225	117
Toledo, Ohio (A)	145	190	102	145	190	102
Topeka, Kansas (C)	36	25	42	36	25	42
Trenton, New Jersey (C)	60	123	55	60	123	55
Tulsa, Oklahoma	5	0	18	5	0	18
Utica, New York (O)	215	236	182	215	236	182
Valentine, Nebraska (A)	186	138	145	186	138	145
Walla Walla, Washington (C)	42	52	93	42	52	93
Washington, D. C. (C)	43	79	32	43	79	32
Wichita, Kansas (A)	35	12	32	35	12	32
Williston, North Dakota (C)	235	264	261	235	264	261
Winnemucca, Nevada (A)	153	150	180	153	150	180
Yakima, Washington (A)	82	131	150	82	131	150

For footnotes, see page 120.

KRAMER UNICON GETS BIGGER and BIGGER

There is only one answer to large capacity condenser problems — the KRAMER UNICON. Every day more engineers plan larger tonnage installations — 50, 100 and even — 800 tons. And every day UNICONS are shipped to all parts of the world for giant-sized installations. No other air-cooled condenser can match the long, successful record of UNICON, backed by thousands of applications since 1937 — in the widest range of tonnages and climatic conditions. Your condensing problems can be best answered by use of the best — the KRAMER UNICON.



Space-saver UNICON, *as illustrated,* serves a 60-Ton air conditioning system, yet takes but 70 sq. ft. of roof space.

UNICON is a remote-type air-cooled condenser that requires no water. KRAMER UNICON can be used with any size compressor, REGARDLESS of horsepower. Any size refrigeration or air conditioning system can be air-cooled with UNICON, REGARDLESS of tonnage. UNICON requires less horsepower, less piping, is easier to install and costs less. KRAMER UNICON performs best — even in semi-tropical climates.

WRITE FOR BULLETIN U-210D

KRAMER TRENTON CO. • Trenton 5, N.J.

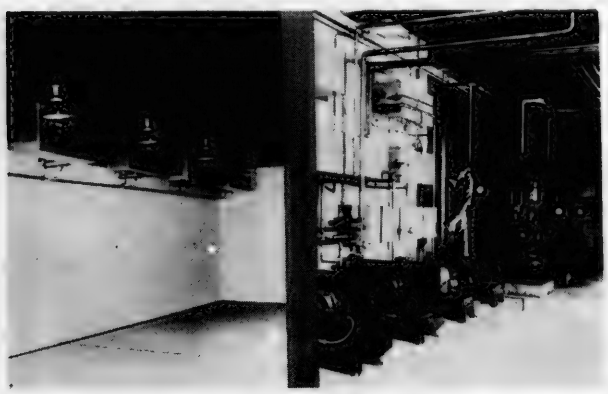
PRODUCT APPLICATIONS

New, Unusual, or Ingenious Uses of Equipment and Materials

Roses in Bud Form Maintained Perfectly Up to 7 Days at Constant 31 Deg

The Hill Floral Products Co., of Richmond, Ind., reports that through proper temperature and humidity control, they have been successful in storing roses in bud form for periods up to seven days. In order to do this, they are using an optimum storage temperature of 31 deg F plus or minus ½ deg and are able to accumulate large quantities of perfect rosebuds for storage before peak selling holidays. The buds are shipped so that they arrive at florists' shops throughout the country and open to form perfect roses for the holiday.

PROBLEM: The narrow limits for permissible tempera-



ture variation and the formation of frost on the refrigeration coils at 31 deg made the selecting of equipment which would insure complete rapid defrost operations necessary. A prolonged defrost operation would allow the room temperature to go above 31½ deg. This fluctuation in temperature would shorten the length of time that the buds could be held in storage.

SOLUTION: Hayes Bros., Inc., Indianapolis refrigeration contractors and engineers, installed the refrigeration system. The storage room, at left in photo, represented an area of 35 by 32 by 10 ft 4 inches high, inside measurements, with an ante-room of 16 by 32 by 10 ft 4 inches high. Part of the contract included a guarantee to hold 31 plus or minus ½ deg. Kramer Thermobank automatic re-evaporative hot gas defrost system, manufactured by Kramer Trenton Co., Trenton, N. J., and three 3-hp and two 1½-hp Frick condensing units were selected.

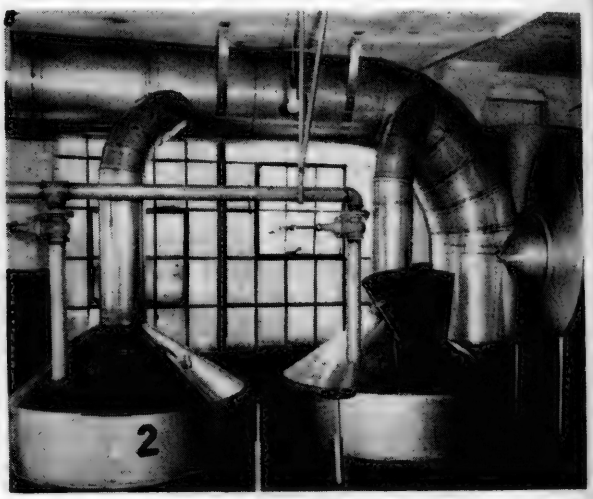
In the storage room were placed three units, each consisting of two evaporators. Each combination is connected to a 3-hp compressor. The six ceiling suspended evaporators are equally spaced along the 53-ft room length. The three systems are arranged so that they defrost at different times. The ante-room has two evaporators, each connected to a 1½-hp condensing unit.

RESULTS: Contractor reports that this job surpassed specifications, and is able to maintain 31 deg plus or minus 0.2 deg.

Hoods, Ducts for Catsup Cook Kettles, of Welded 18-8, Clear Pungent Air

Arc welded 18-8 stainless steel kettle linings, hoods, stacks, ducts and fan housings have given a resplendent new look to the tomato catsup cook room of Red Wing Cannery, Fredonia, N. Y. At the same time, the installation has vastly improved working conditions by removing heat and cooking odors. Maintenance has been expedited by virtue of easier cleaning.

Ten cook kettles are operated, each with 1000 to 1500-gal capacity. Originally unlined and unvented, they are now provided with 20 gage type 316 stainless steel linings, with all seams manually arc welded. Conical hoods, with hinged covers, are of 18 gage type 302 stainless, while stacks are of similar material, 14-inch dia. Stovepipe joints, tack welded to hold position firmly, lead to the main exhaust duct which is 20-inch dia, increasing



to 32 inches as it nears the exhaust fan, at right in illustration.

Because of a somewhat congested area, with extensive piping and equipment, it was necessary to fabricate the exhaust system on the job, rather than prefabricating in the shop. All welds were made with Lincoln Electric Stainweld A-5 electrode, 1/16-inch dia, equivalent to A.W.S. class E-308-15. It is a lime-coated, all-position electrode, operated on d-c in the range of 15-25 amps.

There are two large exhaust fans in the system, both formerly used for general ventilating purposes. Ducts leading to one fan join into a rectangular windbox, the purpose being to equalize the exhaust pressure on all kettles on these lines. This is also the reason for variation in diameter between stacks and the main ducts.

The entire system was engineered, fabricated, and installed by Thies Welding Co., Fredonia, N. Y. Photo, The Lincoln Electric Co., Cleveland, Ohio.

(Product Applications continued on page 126)

CRANE

How to boost your batting average on big boiler bids

Successful bidding on big boiler jobs depends on more than just competitive pricing. Often, the good reputation of the boiler you select can be the "extra" that wins the job for you. Or, some outstanding feature of your boiler may be the deciding factor in your favor.

That's why putting a Crane boiler in your bid can help so much in getting it accepted. Crane boilers have *top reputations*. And Crane boilers have lots of *outstanding features*.

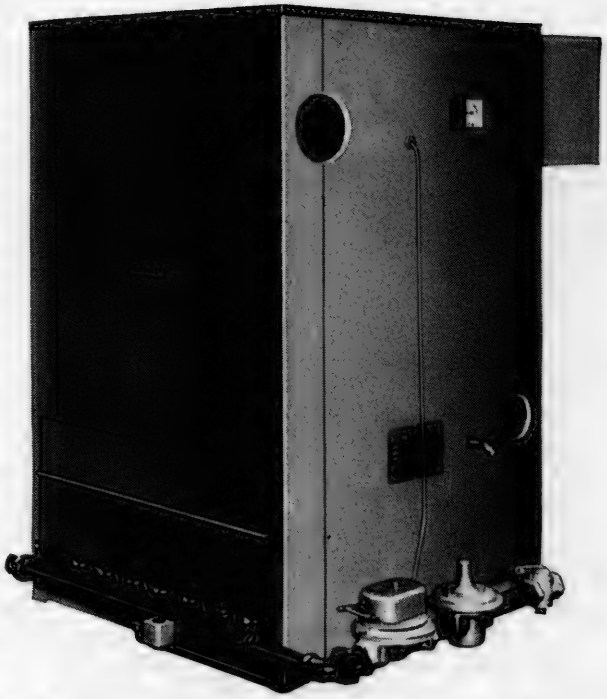
For instance, Crane's Sunnyday 40 and Sunnyday 60 offer you hot water or steam boilers that have been specially designed for gas. As a result, they give you a number of important advantages. Base of boiler is all steel for positive leveling and easy, labor-saving assembly. Patented "Staggered Heat Travel" is an exclusive Crane feature that increases the efficiency. Gross IBR outputs of the two boilers run from 280,000 to 4,000,000 Btu per hour.

Crane 30 and 41 boilers on the other hand are for all fuels and also for either steam or hot water. The Crane 30 has an opening for a built-in tankless water heater. And the Crane 41 has special connections for a heater provided on the back section. Gross IBR outputs range from 268,000 to 2,197,000 Btu per hour for the two boilers.

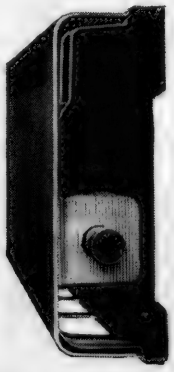
Why not boost your chances of getting your next bid accepted by including a Crane boiler. Get information on Crane's complete line of boilers (residential or commercial) by calling your Crane Branch or Crane Wholesaler now.

CRANE CO. 836 S. Michigan Avenue, Chicago 5

VALVES · FITTINGS · PIPE · PLUMBING · KITCHENS · HEATING · AIR CONDITIONING

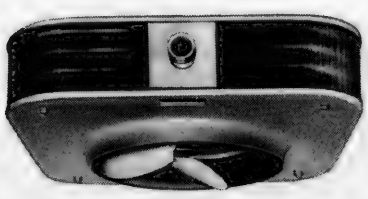


***Here's the famous Sunnyday 60.** This big, hot water or steam boiler together with the Sunnyday 30, 40, and Crane 41 assures you of a boiler that's a perfect fit for any heating problem.*



COMPLETE HEATING SYSTEMS FROM CRANE, TOO

***Crane Sunnywall Radiation**—most durable, most attractive made. Perfect companion to Sunnyday boilers. Shown with copper tubing, aluminum fins. Also available in all steel. Lineal foot capacities from 700 to 2900 Btu.*



***Crane Sunnyaire Unit Heaters** for steam or hot water. Available for horizontal or vertical discharge. Complete range of sizes. Type HV, illustrated, available up to 684,000 Btu per hour.*

Unobtrusive Hotel Air Conditioning Leaves Colonial Decor Intact

PROBLEM: The Park Lane, Toledo, Ohio, is one of the few colonial-style hotels in North America. It has only a minimum basement, its second floor is devoted to transient rooms, and it has low corridor ceilings. There was no conventional way in which to install air conditioning equipment or ducts without monopolizing valuable, and scarce, floor space.

SOLUTION: Hausman Steel Co., Carrier Corporation dealer in Toledo, utilized self-contained equipment concealed in unused areas of the building, and room air

conditioning units. Factory-assembled units are ingeniously hidden in out-of-the-way places. For example, the lobby is cooled with a self-contained unit behind the elevator shaft. The coffee shop air conditioner is housed in an unused stairwell. A shower stall is home for the one that handles the "Georgian" room.

Air conditioning equipment for the dining room is in the kitchen work area. The cocktail lounge unit is recessed in the wall. And in the bar, the air handling apparatus is suspended from the ceiling in a decorative enclosure, as illustrated, while the compressor is tucked away in a closet on the second floor.

Transient quarters are kept comfortable with about 100 room air conditioners installed in windows.

RESULTS: Comfort conditions are maintained, while the colonial motif of the Park Lane remains undisturbed.

Underground Water Sprinkler Systems Pinch Hit for Rain

Underground water sprinkler systems are going "major league." One system of this type has been in operation for several years beneath the playing field at Briggs Stadium, Detroit, home of the American League's Detroit Tigers. Another was used for the first time during the spring and summer of 1956 at Bloomington Stadium, near Minneapolis, Minn., present home for the Minneapolis Millers of the American Association.

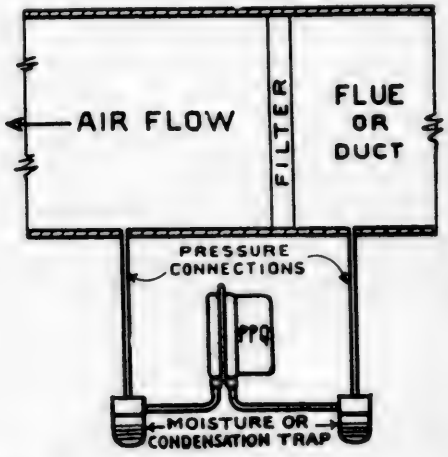
Water for the sprinkler system and stadium building, obtained from the 670-ft deep well, is carried from storage tanks under 60 to 70 lb pressure to the system nozzle valves, 15 of which are positioned in the grassy outfield area, through 5 and 6-inch galvanized wrought iron pipe, produced by A. M. Byers Company, Pittsburgh, Pa. Eighteen tons of the corrosion resistant metal were used for the underground sprinkler system. The piping is drained of water by gravity into storm sewers during late fall.

Rotary pop-off sprinkler nozzle valves were installed to prevent tripping accidents to baseball and football players in all parts of the outfield playing surface. Approximately 6 inches in diameter and covered with ¾-inch rubber, the nozzle valves remain flush with the turf until the system is turned on. Then, the valves rise automatically into spraying position, shutting off automatically when the desired turf moisture is attained.

Toltz, King, Duvall, Anderson and Associates, Inc., St. Paul architectural firm, specified the wrought iron piping system. Thorshov and Cerny Inc., Minneapolis, was the associate architectural firm. T. D. Gustafson and Company, Minneapolis contractor, installed the piping. Pipe bending was handled by Crane Company, St. Paul.

Differential Pressure Control Knows When Filters Are Dirty

Automatic change of filters requires some sensing device which knows when the filters are dirty. As filters begin to clog their increasing resistance to air flow enlarges the pressure differential across the filter.



A differential pressure control, very sensitive to increases and decreases in pressure must be employed. One such is Type PPQ, manufactured by The Mercoid Corp., Chicago, Ill., shown installed across filter in duct. It can be adjusted to open an electrical circuit as the difference between the two pressures increases as little as 0.03 inches or as much as 2 inches of water. The electrical circuit will close on a decrease of 0.03 inches. Operation is independent of atmospheric pressures surrounding the control.

Interruption of the electrical circuit upon increase in pressure differential can actuate, through a relay, a bell, turn on a warning light, or start a motor which changes the filter media.

A CAST IRON BOILER BUILT TO DO A SPECIFIC JOB

•

WEIL-McLAIN "HR" BOILER

HEAVY DUTY UNITS FOR HORIZONTAL ROTARY BURNERS USING HEAVY OIL

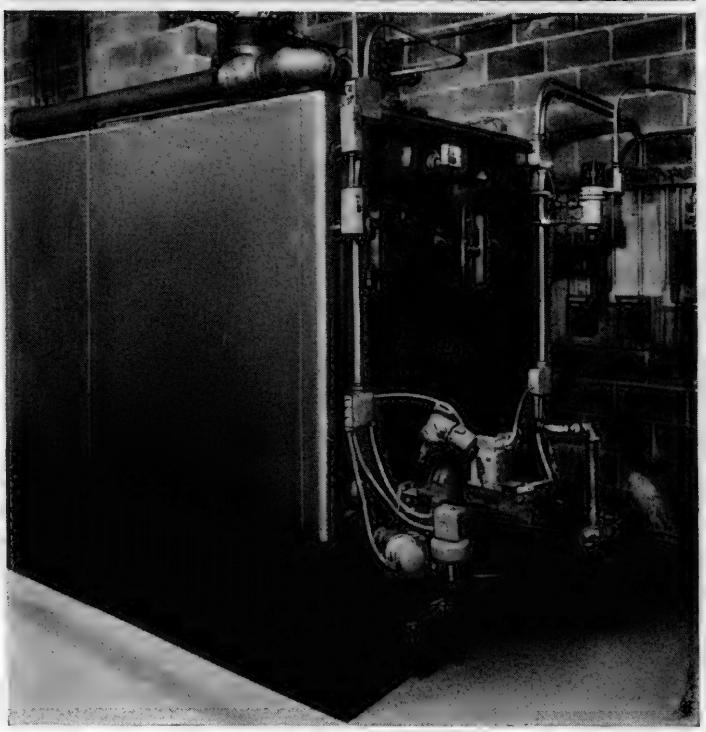
For burning low-cost heavy oils, the Weil-McLain "HR" Boiler offers an exceptional list of proved advantages...in operating efficiency ...smaller space requirements...easy installation...and long life.

"HR" Boiler ratings are based on I-B-R tests with adjustment for rotary burner operation. *These ratings are the result of actual tests and not formulated on measurements of heating surface!* They are certified by the Weil-McLain Company and listed in the Net Load Recommendations of the Mechanical Contractors' Association of America.

The extra high base of the "HR" Boiler makes available ample room for a large combustion chamber—particularly necessary when burning Nos. 5 and 6 oils. *Complete combustion chamber data is available for each size boiler and type of burner.*

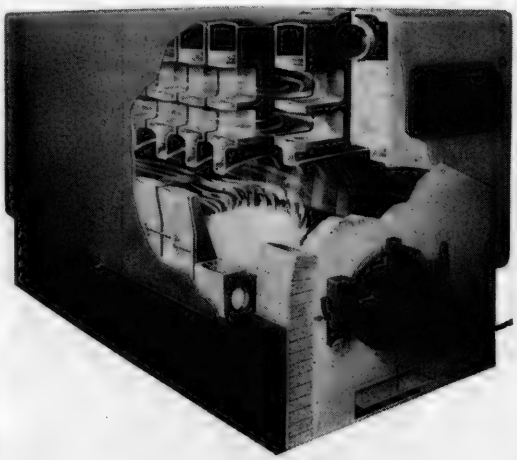
Maximum heating surface is placed directly over the fire, assuring more heat transmission by direct radiation. The flueways are designed to provide a *balanced* back-and-forth flue gas travel for thorough heat absorption.

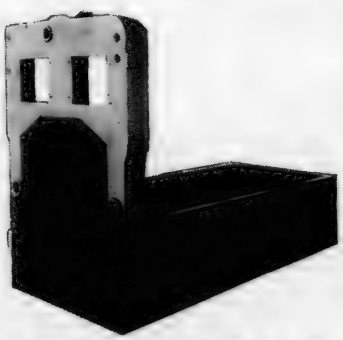
For complete data, send for Bulletin C-188.



Typical installation of 66 H.P. Weil-McLain "HR" Boiler in Wilmington, Del., manufacturing plant.

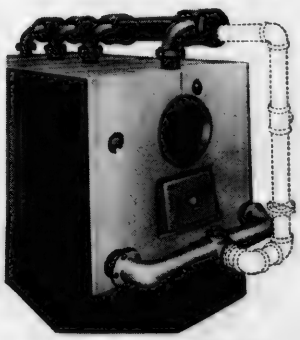
Contractor: Leon E. Wilkins, Wilmington. **Distributor:** Desco Corporation, Wilmington





SPECIAL STEEL FRONT PLATE

A steel plate provided by the factory is bolted to the front sections to simplify burner mounting. The plate has a scribed center line for use in locating the openings required by the various parts of the burner. Upon request, openings can be cut at the factory for specific makes of burners. By installing a wind box on the front plate, "HR" Boilers can be adapted to combination gas-oil burners.



"EASY-FIT" HEADERS

This steam supply header eliminates many erecting problems and cuts installation time. Machined and pre-fitted at the factory, it is shipped partially assembled. Dresser compression fittings are employed to assure a flexible connection between header and boiler and to prevent expansion strains. Return headers are also available for steam and water boilers.

WEIL-McLAIN BOILERS · RADIATORS

WEIL-McLAIN COMPANY

MICHIGAN CITY, INDIANA

Address literature requests to Dept. BB-117

NEWS OF THE MONTH

SOMETHING SPECIAL

promised those who attend 10th Air Conditioning & Refrigeration Exposition. Program for wives.

The 10th Air Conditioning & Refrigeration Exposition, scheduled for the International Ampitheatre, Chicago, November 18 to 21 is forcast by ARI President Lud Emde as follows:

"If you can imagine five million dollars' worth of displays, seven thousand five hundred different products, over two thousand experts on hand to answer your questions, and twenty thousand old friends as visitors, you'll get some idea of what's waiting for you in Chicago."

The invitation was extended to all members of the industry. The ARI president urged industry executives to bring their wives and promised a full entertainment program for them. He also urged companies to form "teams" of visitors which include associates and "up-and-coming members of your staff."

ASRE EARLY STARTER

Activities will begin almost a week ahead of the show, on Tuesday, Nov. 12, when various ASRE committees start their meetings. By Thursday, they will be in full swing and will continue over the weekend and through the following week, until the final sessions of NWAH&ACA on Friday, Nov. 22.

The show will open at 2 p.m. Monday, Nov. 18 and remain open that night until 10 o'clock. The show will be open from 10 a.m. to 6 p.m. on Tuesday and Wednesday, from 10 a.m. to 4 p.m. on Thursday. On the last day, the general public will be admitted.

HONG KONG

is way ahead in air conditioning of shops, hospitals, hotels, and other business establishments.

"Air conditioning is an accepted standard of living in Hong Kong, while cooling for industry is steadily assuming greater importance," says T. F. Waung, president, Engineering Service Company, new distributor of equipment in the area for The Trane Company.

Waung, here for a series of conferences with Trane sales personnel, was surprised, he said, "to note the absence of air conditioning in many U. S. business places similar to those in Hong Kong, which are all equipped with cooling systems.

"For instance, cooling is as much a customer must in Hong Kong barbershops, theaters, clothing stores and other business establishments, as is lighting. All new hospitals are completely air conditioned, as are most new multi-story office buildings and hotels," he observed.

Waung also noted cooling gains on the Free-China industrial scene. He said that the cooling trend is especially noticeable in the textile and plastic fields, with growing sales anticipated in the soy bean industry.

NATIONWIDE SURVEY

is undertaken this fall to measure current usage and predict future of air conditioning.

A nationwide survey to measure current penetration and future potential of air conditioning in the commercial-industrial field is being undertaken by Du Pont Company.

Third in its series of studies of the air conditioning market, the survey will be conducted for the company's Freon Products Division by W. R. Simmons Associates, Inc., of New York City, who plan personal interviews with about 2700 firms to obtain an accurate and projectable cross section of business plans.

TO GUIDE PRODUCT DEVELOPMENT

According to the announcement, numerous manufacturing plants, office buildings, hotels and motels, retail stores, and public institutions will be included in the survey which, in addition to measuring current usage of air conditioning, is expected to provide the refrigeration industry with valuable information for charting its future product development and marketing plans. Previous surveys conducted by Du Pont, whose refrigerants are used in much of today's cooling equipment, dealt with the markets for room air conditioners and central residential cooling systems.

INDOOR CLIMATE

design conference at UCLA hears call for central authority and design progress.

Man needs greater progress in indoor climate design and a central discipline or authority to bring existing knowledge into focus and use.

These two recommendations of scientist and industrialist emerged as probably the major fruits of the first U. S. conference on designing the indoor climate, held September 12 and 13 on the University of California at Los Angeles campus, with Dr. L. M. K. Boelter, dean of engineering, as host and keynoter.

The conference was sponsored by the UCLA Department of Engineering and Engineering Extension in cooperation with the Institute of Heating and Air Conditioning Industries.

Its aim was to help interact academic with field knowledge and help educate the consumer to highest available standards for promotion of human health, comfort, and productivity.

Lack of adequate design progress was advanced by at least two principal conference participants, William A. Ray, president of General Controls Co., Glendale, Calif., and architect John Rex, AIA, UCLA Department of Engineering lecturer, and by a prominent newspaperwoman, Selma Andrews of Los Angeles.

(Continued on page 130)

TEMKON

AIR CONDITIONING AND REFRIGERATION

TEMPERATURE LIMITED

BURLINGTON ROAD, LONDON, S.W.6, ENGLAND
CABLES : TEMTUR, LONDON

LARGEST PRODUCER OF

AIR CONDITIONING UNITS OUTSIDE THE U.S.A.

Ray said the concept of introducing conditioned air through a single outlet is obsolete and called for a totally different and revolutionary design approach that would introduce the air into the room through new methods, like the walls. Rex proposed a double shell structure as one means of eliminating the network of ducts which now wastes space and creates design problems. Mrs. Andrews, speaking with other Southern California newspaper-women for homemakers, urged simplification of installation and of equipment to reduce the number of different craftsmen now invading the home, especially in remodeling, and to bring down the size of the heating-cooling-purifying devices themselves.

AIR CONDITIONED SCHOOL COSTS LESS

Dramatic disclosure of cost economy made possible by adequate advance planning of design was made by John E. Haines, vice president of Minneapolis-Honeywell Regulator Co., who said a Texas (San Angelo) school board successfully has planned an air conditioned school for 7% less cost than non-air conditioned ones. This, Haines said, was actual dollars and cents saving without even taking into consideration vastly improved learnability which air conditioning gives students.

The key plea for central discipline or authority in the field of environmental control was sounded by Frank Stead, chief of the division of environmental sanitation of the California State Department of Public Health.

Like engineering professor F. W. Hutchinson of the University of California at Berkeley, who also asked for a better design integration, Stead told the conference that "activities related to studying and controlling air composition are widely scattered among groups of people whose activities are not coordinated in any way."

CENTRAL AUTHORITY URGED

"In fact", said Stead, "one might say with considerable truth that those entrusted with the stewardship duty of guarding air quality for society do not even acknowledge each other's existence, let alone compare notes."

Stead's assertion was in substantial agreement with opinions uttered by others, urging that architects, builders and engineers coordinate their planning in order that air conditioning might not be relegated to the status of an expensive afterthought.

Stead, speaking on "Man's Influence on Air Composition," pointed out that air pollution problems are not confined to urban areas. Rural regions too, he said, suffer from pollutants such as dust from storms, peat, cement plants, hot road mix plants and turkey ranches; smoke from sawdust burning and orchard heating; odors from faulty disposal of organic industrial wastes; toxic aerosols from insecticides; and fallout from nuclear weapons testing.

Man himself contributes to air pollution in enclosed spaces, Stead declared. Defining a human being as a "heat machine with 20% thermodynamic efficiency," Stead said the average person breathes out 15 cu ft per hr at rest and 100 cu ft at maximum exertion. The chief problem connected with human influence on the atmosphere, however, is not the heating or humidifying effect but body odors and bacterial dispersion.

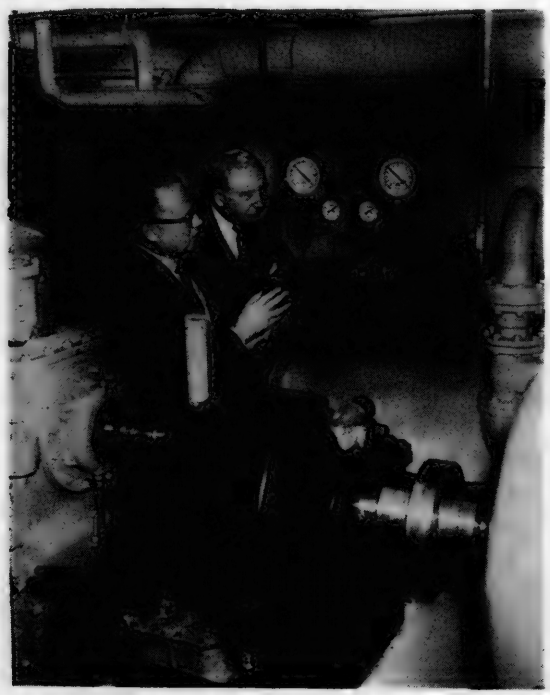
CLIMATE AND LONGEVITY

Dr. L. P. Herrington, Yale University lecturer, speaking on "Human Requirements for the Ideal Indoor Climate," declined to speak of human "comfort," preferring to use the term "minimum thermal stress." He said that "the three great environmental protections contributing to health and longevity have been food, clothing and habitation." He said "the great physician of mankind has been the builder."

Herrington spotlighted a problem in air conditioning by showing that human metabolism steadily diminishes with age. For example a kindergarten child might have a metabolism of 53 while the teacher's was only 33. The adult would therefore require a measurably warmer environment than the children.

Herrington asked: "Do we have any reason to believe that unfavorable climates, uncompensated by conditioned housing, reduce life expectancy?" Answering his own question he replied, "We do." He presented a life ex-

(Concluded on page 132)



When G. S. Eyssell, president of Rockefeller Center, Inc., New York City, and Cloud Wampler of Carrier Corporation pressed the button activating two new refrigeration machines, the Center became the largest office building air conditioning installation in the world, with 15,382 installed tons. Former leader was the Pentagon in Washington with 14,300 tons, now in second place. Runners up are Merchandise Mart, Chicago, with 8,500 tons; Southland Center, Dallas, with 6,450; Empire State Building in New York City, 5,250; Gateway Center, Pittsburgh, 4,500; Socony Mobil Building, New York City, 4,285; United Nations Secretariat, New York City, 4,168; New York Coliseum, New York City, 4,050; and Prudential Building, Chicago, with 3,400 tons.

DUAL-DUCT

WITH DIRECT, AUTOMATIC VOLUME CONTROL

Exclusive with Buensod dual-duct air mixing units is direct volume control without the use of a sensing instrument. They maintain constant air quantity through each unit regardless of variance of static pressure on either inlet or outlet of mixing value.

NOW AVAILABLE IN ALUMINUM!

For the first time, you can order dual-duct air mixing units made of aluminum, inside and out. It's a Buensod first. Only Buensod makes aluminum air mixing units. Lighter by 60 per cent. Corrosion-resistant. The obvious choice for your next project.

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Shreveport, R. F. Zimmerman & Co.
Spokane, Wash., General Equipment Co.
Tampa, Fla., H. L. McMurry & Co.
Toledo, Air Handling Products Co.
Washington, D. C., Lancaster May & Co.

pectancy table, correlated with temperatures and metabolism rates, to prove his point.

USE AUTOMATIC LOUVERS

At the second day's session, John Rex, lecturer for the American Institute of Architects, disclosed that in the last 15 years Los Angeles has added 78 million square feet of air conditioned space—enough for a building 50 feet wide running all the way to Las Vegas. Despite a past lag, Rex said, Los Angeles has now air conditioned 20% of its buildings, the traditional point at which the remaining 80% tend to follow suit. Rex's talk was entitled "Role of Building Design in Environmental Control."

Rex said the new Los Angeles Hall of Records will be a leader in climate control design. It will be equipped with aluminum louvers 130 feet high, he said. Each louver will be an airfoil shape 52 inches wide, equipped with photo-electric cells which control the louver automatically. Rex conceded that such devices are costly but insisted that such an installation will pay for itself within 10 years by reason of savings on operational costs of air conditioning.

F. W. Hutchinson, professor of mechanical engineering at the Berkeley campus, speaking on "Static and Dynamic Methods of Environmental Control," called for greater advance study and planning of thermal factors normally not ever considered by heating and air conditioning designers.

CONDITIONING IS NO EXPENSE

John E. Haines, vice president of the Minneapolis-Honeywell Regulator Company, talked of the "Economics of Year 'Round Air Conditioning." Haines said that despite the advances of the last 50 years less than one-third of non-residential buildings constructed or remodeled in 1956 had any form of cooling. Less than one-tenth had complete year-round air conditioning.

Haines quoted figures showing how air conditioning boosted efficiency for a utilities company by 51%, increased government stenographers' output by 24%, hiked production at a hosiery plant by 29%, reduced absenteeism in certain New York plants by 25 to 30% and caused a 25% decline in rework at a watch factory.

He said complete air conditioning would add only 1% to the cost of owning and operating an average new industrial building; 1.5% for an existing industrial building. For an average new office building the figure would be .8%; for an existing office building 1%.

The two-day session concluded with a two hour panel discussion moderated by Dean Boelter and including Herrington, Hutchinson, Haines, Rex and Ray.

PANEL BACKS PRE-PLANNING

The panelists agreed that pre-planning of air conditioning is essential. Hutchinson said a house built without pre-planned air conditioning may "look right but it lives terrible." He predicted that within 10 years there would be either full liaison between architects and engineers or that architects would be held formally responsible for thermal efficiency—or inefficiency.

Rex endorsed this contention. He spoke of the shell-within-a-shell construction obviating the need of heterogeneous ducts and pipes. He spoke of the jocular slogan of the California air conditioning industry, "Controlled environment from the womb to the tomb." He added that he had recently observed an air conditioned cemetery crypt, giving point to the slogan.

Further endorsement to pre-planning came from Haines who mentioned the astonishing case of a school in San Angelo, Texas with built-in air conditioning and which actually cost 7% less than a comparable school without air conditioning. The cost economy stemmed from the savings on insulation and other construction factors.

Herrington said experiments showed that the temperature at which heavy work can be carried on with the fewest accidents is 55 to 60 deg F. He said mental errors, such as clerical inaccuracies, tend to increase after 79 deg. He said observations of albino rats suggest that in a warmer environment an animal's life span increases but so does lethargy.

Ray said frankly that "better indoor climate is going to cost more. Certainly however consumers who are making adequate annual outlays for automobile air conditioning can be enlightened as to the need for proper indoor climate at comparable annual financial costs."

In connection with its certified rating program, Air Moving and Conditioning Association announces that in order to qualify, a product must be tested in accordance with AMCA Standard Test Code in an AMCA-approved laboratory. Above are typical fan test set-ups for vane-axial and centrifugal fans and blowers. To qualify a test lab, tests must be conducted with AMCA witness present. Witness' report includes a sketch of test set-up and room, description of each piece of test measuring equipment, and various data sheets. Manufacturers who qualify may use the Association's seal.

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but it takes every bend and fold...

without chipping or flaking, because...

Wheeling SOFTITE® has the tightest zinc coating yet produced"

What makes Wheeling SOFTITE different from other galvanized sheets? Just ask any sheet metal man or air conditioning contractor who has tried them.

They'll tell you that Wheeling SOFTITE takes every bend, every crimp, every tortuous fold without ever cracking or peeling. That's because SOFTITE is ductile, so it's easy to work. At the same time it has the tightest zinc coating yet produced. That's why SOFTITE ducts look so good, last so long, and give service above the call of duty.

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BOOK REVIEWS

Publications abstracted in this department should be ordered direct from publisher

THERMODYNAMICS OF HEAT-POWER SYSTEMS

Thermodynamics of Heat-Power Systems, by F. W. Hutchinson, Professor of Mechanical Engineering, University of California, was prepared for use as a textbook for an introductory thermodynamics course.

The author states that the present treatment followed in this book is based on twenty years of teaching experience with some 3000 students and follows a pattern which though simple, has not been used in any of the texts now available.

Wherever possible, the technical material is developed in terms of a generalized equation or a generalized example. This method is thought advantageous in that it gives the student an opportunity to obtain specialized equations either by simplification from the generalized or by direct derivation. The intent of the book is to provide a descriptive core of fundamental principles and concepts that the teacher can use as a base into other fields.

The twenty chapters in the book are divided into seven general classifications as follows: Energy sources; energy in storage; energy liberation; energy in transition; energy transformations; energy transportation; energy utilization.

Thermodynamics of Heat-Power Systems, by F. W. Hutchinson. Cloth bound, 6 x 9 inches, 490 pages. Published by Addison-Wesley Publishing Co., Inc., Reading, Mass. Price, $8.50.

ELEMENTARY THERMODYNAMICS

While there are many books covering the subject of thermodynamics, this one on Elementary Thermodynamics by Virgil M. Faires, professor of mechanical engineering, North Carolina State College, was prepared for use by students taking a short course. A third edition has just been published.

Most of the basic theory is covered at the beginning of the book and there is a clear indication of which principles and methods apply to gases and which to vapors. There is a section in back of the book that is devoted to problems.

Elementary Thermodynamics, 3rd edition, by V. G. Faires. Cloth bound, 6 x 9¼ inches, 379 pages. Published by The MacMillan Co., 60 5th Ave., New York 11, N. Y. Price, $6.75.

CENTRIFUGAL AND AXIAL FLOW PUMPS

Since Dr. A. J. Stepanoff of Ingersoll-Rand Company had his book published on Centrifugal and Axial Flow Pumps in 1948, there have been many new applications for such pumps and considerable progress has been made in the design of such units.

The second edition of this book, which is now available, has a number of changes as compared with the first edition to bring the subject up to current practice.

A new chapter has been added on Water Hammer Problems in Centrifugal Pump Systems. The chapter on centrifugal jet pump system has been revised and expanded. A number of new charts and illustrations are included and many other improvements have been made.

Included are chapters on theory of the centrifugal pump impeller; vortex theory of Euler's head; specific speed and design constants; design of mixed flow impellers for centrifugal pumps; pump casing; axial flow pumps; hydraulic performance of centrifugal pumps; leakage, disk friction, and mechanical losses; axial thrust; cavitation in centrifugal pumps; special operating conditions of centrifugal pumps; special problems of pump design and application; shaft design for critical speeds; special problems and applications of vertical turbine and axial flow pumps; special problems and applications of centrifugal pumps; centrifugal jet pump water systems; and water hammer problems in centrifugal pump systems.

Centrifugal and Axial Flow Pumps, 2nd edition, by A. J. Stepanoff. Cloth bound, 6 x 9 inches, 462 pages. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. Price, $12.

ASRE DESIGN VOLUME

A well recognized book by the industry is the Design Volume of the Air Conditioning-Refrigeration Data Book, sponsored by the American Society of Refrigerating Engineers. The tenth edition, about 85% revised, is now available.

Each of the 39 chapters was written specifically with design considerations in mind. The authors are 44 experts in their respective fields. Included in the book is information on physical data, application design, basic equipment, auxiliary and self-contained units, operation, codes, standards, abbreviations, symbols, definitions, theory, engineering and refrigerants. It has a classified section which lists manufacturers of components and assembled units of refrigeration equipment.

ASRE Data Book—Design Volume, 10th edition. Cloth bound, 800 pages. Published by the American Society of Refrigerating Engineers, 234 Fifth Ave., New York 1, N. Y. Price, $10.

ELEMENTS OF HEAT TRANSFER

For many years, Elements of Heat Transfer and Insulation, by the late Max Jakob of Illinois Institute of Technology and George A. Hawkins, dean of engineering, Purdue University, has been an undergraduate text book. The third edition is now available with a change of title to Elements of Heat Transfer.

It presents the fundamental modes of heat transfer, followed by a combination of two or more modes.

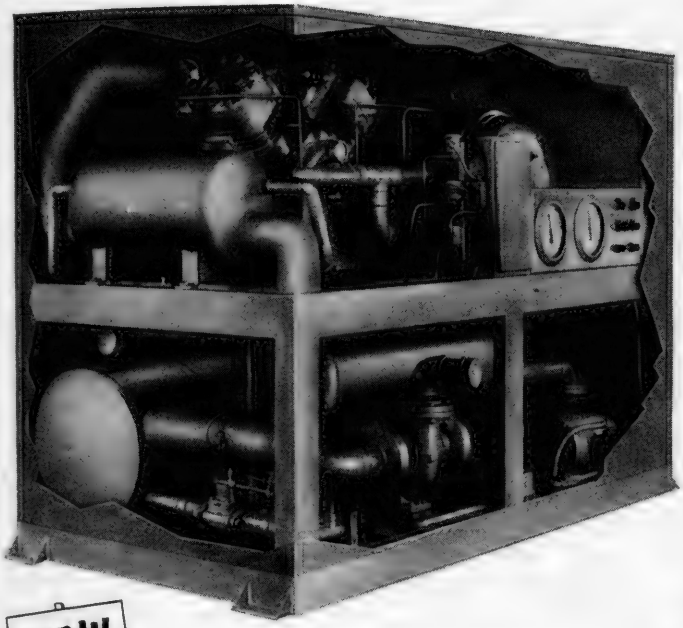
A new section has been added on the use of equivalent circuits for the solution of heat transfer problems. The chapter on Heat Transfer by Free Convection has been revised to include additional material for the analysis of engineering systems.

New sections discuss the heating of liquid metals, the hydrodynamic and thermal boundary layers, convective

(Continued on page 148)

See OUTSTANDING B&G ADVANCES IN PACKAGE COOLERS AND REFRIGERATION COMPONENTS

B&G presents a complete line of air conditioning and refrigeration equipment, alive with new, exclusive features! New efficiencies have been designed into these products which materially reduce space requirements—improve operating economy—add to life of the equipment.



COMPLETELY SELF-CONTAINED PACKAGE LIQUID COOLERS—7½ to 75 tons

Compare the *standard* equipment of the B&G Package Liquid Cooler with that of any other... see for yourself that you can have B&G quality at smaller installed cost. For example—

No inside wiring. All controls furnished—completely wired and interlocked.

No inside piping. All pumps are mounted, piped and electrically interlocked.

No framing. All equipment is mounted on permanent steel frame.

No metal forming. Heavy gauge steel jacket is sound-deadened, Hammerloid finished.

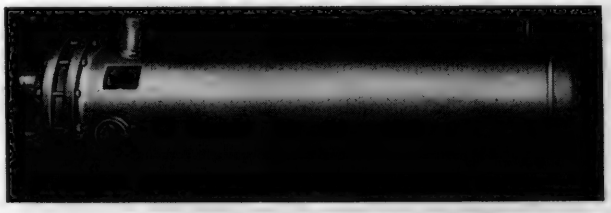
No insulating. Suction line and heat exchanger are fully insulated.

No testing. Fully tested under specified operating and varying load conditions.

No extras. Furnished complete with gauges, compressor motor and flywheel, increment start, heat exchanger and full charge of Freon.

EVAPORATOR—50% smaller

This Code stamped ASME Evaporator features tubing with specially designed interior metallic spline which almost triples inside heat transfer area... reduces unit size and Freon charge. Tube design permits U-bend construction without losing contact between spline and tube. *B&G Evaporators are unconditionally guaranteed against tube damage from freeze-ups!* Leak-proof, styrene insulation is molded directly on shell.



CONDENSER—2 to 200 tons

One-third smaller than previous models—less Freon needed. Exclusive design lowers pressure drop—raises operating efficiency. Tubes are rigidly supported in stacks with metal-to-metal contact between fins for free drainage of condensing Freon. Expensive sight glasses are eliminated by providing three liquid level openings. ASME Code stamped for Freon 12 and 22.

QUIET PUMPS

B&G 1522 Pumps are noted for *quiet*, leak-proof operation—ideal for cooling tower applications.

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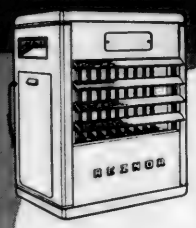
Canadian Licensee: S. A. Armstrong Ltd., 1400 O'Connor Drive, Toronto 16, Ontario

modern heating for business and industry...

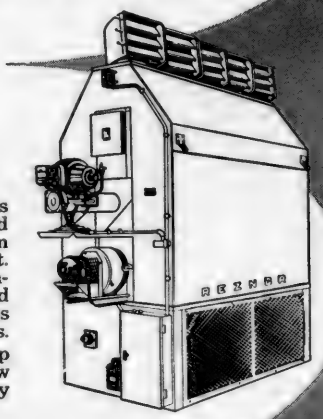
REZNOR UNIT HEATERS



SUSPENDED TYPE

Gas-fired—for use with natural, manufactured, mixed or LP gases. Eleven sizes: 25,000 to 300,000 Btu input. All sizes available with choice of propeller fan or centrifugal blower for air movement. FlexiTemp control system, featuring automatic two-speed fan operation, optional on propeller fan models up to 100,000 Btu. Aluminized steel construction standard, stainless steel optional at extra cost. These heaters are self-contained, completely automatic units for the production and distribution of heat at the point of need. Installation involves only suspension, utility connections and venting. Practically no maintenance required.

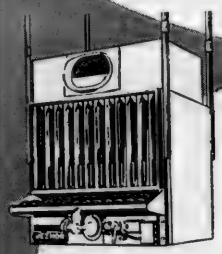
Floor-mounted models for use in offices and similar areas available in 25, 50, 65, and 75 thousand Btu sizes.



FREE-STANDING TYPE

These stainless steel direct-fired heaters are designed for large industrial and commercial space heating jobs. Ten sizes, 400,000 to 2,000,000 Btu input. Heaters can be equipped with gas burners (for natural, mixed, manufactured or LP gases), oil burners (for fuel oils through #5 grade) or dual-fuel burners.

Heaters may be floor-mounted for top discharge or suspended for down-flow or horizontal discharge. They are easily adapted for use in duct systems.



DUCT TYPE

Reznor duct heaters are compact, highly efficient gas-fired heat exchangers with a full complement of operating controls. They are designed for assembly in custom engineered duct systems with components for air moving, cooling and filtering specified to meet exact job requirements.

Series DS sectional duct furnaces (shown) are available in 4 sizes . . . 150, 200, 250, and 300 thousand Btu. Systems with capacities in excess of 2,500,000 Btu can easily be assembled using these four basic units. Aluminized or stainless steel construction. Accessory blowers available to meet most air delivery requirements.

there is no equivalent for Reznor unit heaters

for complete details, wherever you are . . .

Look for Reznor under "Heaters-Unit" in the Yellow Pages

REZNOR
WORLD'S LARGEST-SELLING DIRECT-FIRED UNIT HEATERS

Reznor Manufacturing Company
64 Union Street, Mercer, Pa.

NEW CATALOGS

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

OIL BURNER CONTROLS—A residential oil burner controls handbook to provide the dealer, installer, and serviceman with a condensed guide for installation and servicing is available from Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Included in the booklet are sections dealing with stack-mounted relays, electronic relays and flame detectors, oil valves, troubleshooting tips and conversion hints. Installations of both new and old models of the company's controls are covered. The handbook is the third in a series. Previous editions covered other fuels and instructions on installation of thermostats, relays.

Circle **Item 61** on Inquiry Card

IMMERSION CIRCULATING PUMPS — A 4-page bulletin, No. 4310, available from The Deming Company, Salem, Ohio, describes a new line of vertical (immersion type) circulating pumps. The bulletin includes recommended applications of the pumps as well as capacity and head performance tables, construction features, and dimensional drawings.

Circle **Item 62** on Inquiry Card

ALUMINUM AIR FILTERS — Bulletin EAF-257 from The George Evans Corp., Moline, Ill., illustrates and describes the company's line of precision made, all-aluminum air filters. Easily cleaned with tap water, the filters feature a 39% lower and slower resistance rise per gram of dirt caught.

Circle **Item 63** on Inquiry Card

SATURABLE POWER REACTORS — 32-page Bulletin F-8383, an application guide for the use of saturable power reactors, is available from Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill. The new publication discusses saturable power reactor uses, turn down characteristics and the application of automatic control to these units. With proper temperature measuring instruments and a d-c source, usually a magnetic amplifier, it is possible and very practical to use a saturable reactor to control a-c power to furnaces, heaters and other equipment supplying resistive loads.

Circle **Item 64** on Inquiry Card

STEAM HEATING COILS— A new booklet, B-1710, entitled Steam Heating Coils is offered by Westinghouse Sturtevant Division, Hyde Park, Boston, Mass. Containing pictures and descriptions of commercial and industrial coils, the 26-page booklet also provides piping diagrams and many performance and selection tables.

Circle **Item 65** on Inquiry Card

(Continued on page 138)

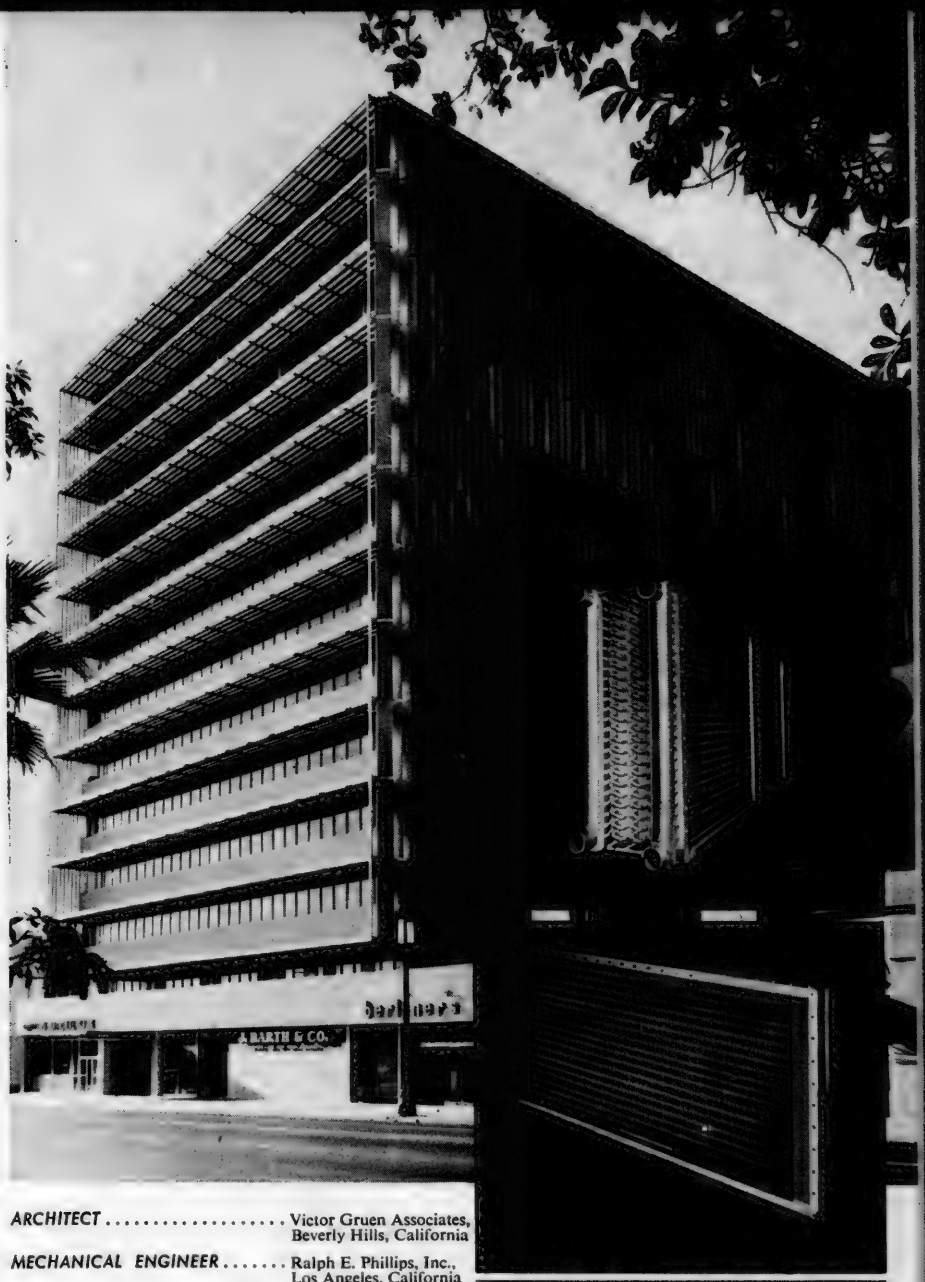
NEW TISHMAN BUILDING
3325 Wilshire Boulevard
Los Angeles, California

Air Conditioned

OF COURSE

McQuay

RIPPLE
FIN COILS



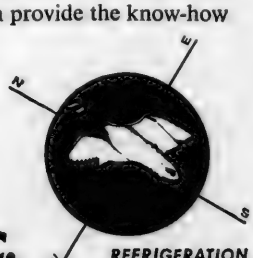
ARCHITECT ..... Victor Gruen Associates, Beverly Hills, California

MECHANICAL ENGINEER ..... Ralph E. Phillips, Inc., Los Angeles, California

MECHANICAL CONTRACTOR .... J. Herman Co., Inc., Los Angeles, California

The new, completely air conditioned Tishman Building is an example of the versatility of McQuay heating and cooling coils, as it was necessary to design this flexible system so that it would meet the space requirements of future tenants as the building became leased. McQuay heating and cooling coils were used in central supply systems located on every other floor which supply hot and cold air to a duct system which passes through the central part of the building. As floor space was rented, lateral duct run-outs were installed to precisely and economically serve the areas occupied. There is a McQuay heating or cooling coil to exactly meet the requirements of every heating, cooling or air conditioning job—and do it efficiently and economically with the lowest possible investment. Years of experience, years of research provide the know-how for which McQuay is famous.

McQuay INC.



REFRIGERATION
HEATING
AIR CONDITIONING

These 5 big plus advantages prove you're right to choose

Power Line

for your industrial ventilation requirements

1. Complete line: Broadest product line of air-moving equipment for every industrial requirement.

2. Certified performance: All Power Line Fans are rated by PFMA and by NAFM.

3. Backed by 33 years of specialization in manufacture of highest quality ventilation equipment.

4. Competitively priced to give you important cost savings in initial investment and in maintenance. You get the precisely right product to fit your requirements. You don't over-buy with equipment too large or under-buy with equipment too small.

5. Sold only through qualified ventilation specialists. You get expert technical advice and service from the survey of your requirements right through to the completion of your installation.

YOURS ON REQUEST: Big 20-page Power Line Catalog gives complete facts about industrial ventilation, including selection of proper type and size of fan, calculation of duct resistance, and installation procedures, plus features, dimensions, specifications and performance data. Without obligation write for your free copy of Catalog No. 36.

POWER LINE FAN COMPANY, INC.

Subsidiary of **Chelsea Products, Incorporated** 639 South Avenue, Plainfield, New Jersey

NEW CATALOGS

(Continued from page 136)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

GATE VALVE LINE—The money-saving advantages of the King-Clip gate valve, a development of Lunkenheimer Co., Cincinnati, Ohio, for the most severe 125 and 150-lb service applications, are featured in a newly revised and expanded edition of Circular No. 561. The 4-page, file-size bulletin, printed in two colors, is completely illustrated with cutaway drawings and photographic reproductions. Detailed data is included for the many different types of King-Clip gate valves now avaialble.

Circle **Item 66** on Inquiry Card

INDUSTRIAL AIR CONDITIONERS — A bulletin on remote packaged air conditioners for industrial applications is being offered by Worthington Corporation, Harrison, N. J. Available in three sizes, 15, 20 and 25-ton capacities, the units provide year-round air conditioning with fan and accessory sections designed for either vertical or horizontal arrangements to satisfy any installation requirement. The bulletin contains complete specifications and dimensional data. Interchangeability of component parts for a variety of vertical and horizontal arrangements are graphically illustrated.

Circle **Item 67** on Inquiry Card

RING AND CIRCLE SHEAR — Just published by Niagara Machine & Tool Works, Buffalo, N. Y., is illustrated Bulletin 70F Supplement 2, which introduces the company's Ring & Circle shear with finger-tip control and power downfeed. The bulletin describes how features including convenient pushbutton control, self-compensating circle arm, and high-chrome, high-carbon cutters make quick, easy work of cutting commercially perfect circles, circular holes and rings.

Circle **Item 68** on Inquiry Card

TURBINE PUMP MOTORS—The Louis Allis Co., Milwaukee, Wis., has published a new 4-page bulletin, No. 2050, entitled Climatized Vertical Hollow Shaft Motors. These open drip-proof motors, in NEMA frames 364 through 505, are for shallow and deep-well turbine pump applications. The bulletin stresses such motor features as "climatized" enclosure that provides all-weather security, improved thrust bearing design, metered lubrication, and a protected bearing system. Illustrated are installation and maintenance time-reducing features.

Circle **Item 69** on Inquiry Card

(Continued on page 140)

DRY AIR...
PRECISELY as you want it

NIAGARA CONTROLLED HUMIDITY AIR CONDITIONING

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

AT THE
CHEMICAL SHOW
28th EXPOSITION OF CHEMICAL INDUSTRIES
Coliseum New York City, December 2 - 6, 1957
See NIAGARA
AIR CONDITIONERS • Aero HEAT EXCHANGERS
Aero AFTER COOLERS • Aero REFRIGERANT CONDENSERS • Aero STEAM CONDENSERS
Aero VAPOR CONDENSERS • HUMIDIFIERS
HEATERS • COOLERS • DRYERS
BOOTH No. 655

Write for full information; ask for Bulletins 112 and 121. Address Dept. HV-11.

NIAGARA BLOWER COMPANY
405 Lexington Ave., New York 17, N. Y.
District Engineers in Principal Cities of U.S. and Canada

Safer
because it's
Simpler

■ Of all boiler water level controls, we believe Magnetrol to be the safest. Certainly it is the simplest.

A PERMANENT Alnico magnet, located *outside* the float chamber, links boiler water level and electrical controls. This infallible magnetic link eliminates mechanical parts normally subject to wear and fatigue failure. *Pioneered and perfected by Magnetrol,* it provides almost unlimited operating life.

The brass "No-Scale" float chamber liner, another exclusive Magnetrol feature, is self-cleaning. It actually "flexes" off scale and prevents "sticking" of the float.

These are just two of *many* advances for greater boiler safety found *only* in Magnetrol. *Standard* Magnetrol units are available for temperatures up to 750°F., at pressures up to 600 psi, for single stage (low water cutoff) or multi-level stage (pump control *plus* low water cutoff and alarm) service with as many as three separate switching actions. Special units are available for more extreme requirements.

A magnetic sleeve, raised and lowered within a non-magnetic tube, "trips" or releases an Alnico permanent magnet attached to a mercury switch. Basically, this is Magnetrol.

MAGNETROL, Inc.
Mail the Coupon Now for the Facts

MAGNETROL, INC., 2106 S. Marshall Blvd., Chicago 23, Ill.

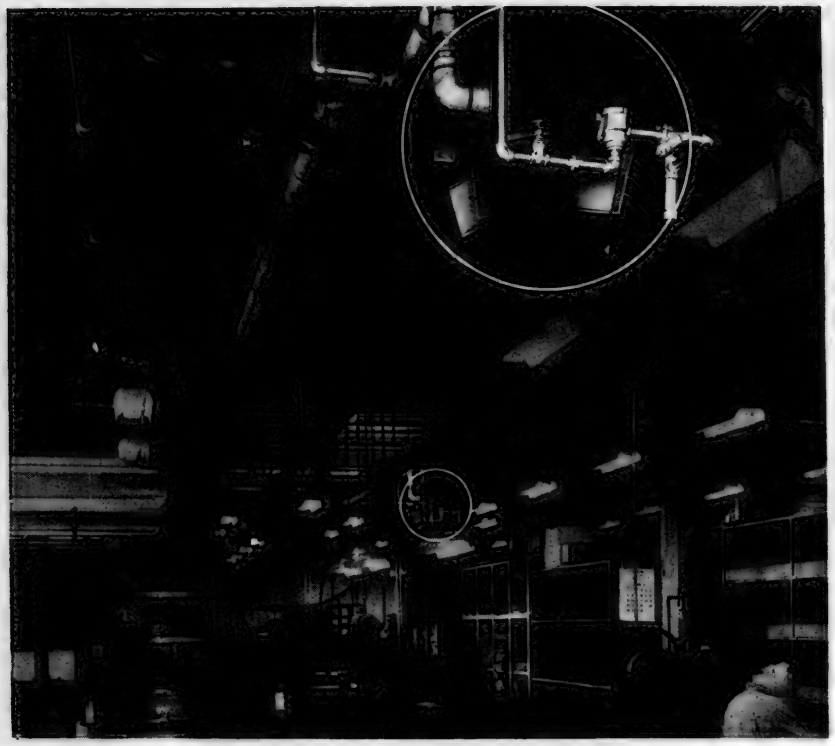
Gentlemen: Please send me Catalog Section III and full information on Magnetrol Boiler Water Level Controls. 9

Name .....

Company .....

Address .....

City .....*Zone* .....*State* .....



REVOLVING Heat will increase productivity . . . because

it plays no favorites!

You know how it is in some plants (perhaps in yours) . . . some lucky worker is located just *between* the steady fixed streams of hot air from the unit heaters, and he's the envy of the rest of the crew. Especially of those directly in the path of the hot air streams.

But in the plant heated by Wing *Revolving* Heaters, *everybody's* lucky . . . these heaters play no favorites. There *are* no steady streams of hot air. The slowly revolving outlets keep the air streams moving constantly, creating a gentle, warm refreshing breeze that keeps everybody happy and productive.

You ought to find out what they can do for you. Send for a bulletin.

L. J. Wing Mfg. Co. 158 Vreeland Mills Road · Linden · N. J.
DIVISION OF AERO SUPPLY MFG. CO. INC. In Europe: WANSON, Haren Nord, Brussels, Belgium

Wing

•REVOLVING•
UNIT HEATERS

FANS • UNIT HEATERS • DRAFT INDUCERS • BLOWERS • TURBINES

NEW CATALOGS

(Continued from page 138)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

THERMOSTAT ACCESSORIES — A variety of modern accessories for electric thermostats and limit controls manufactured by Robertshaw-Fulton Controls Co., Richmond, Va., are described in a four-page bulletin. Bulletin RT-819 contains detailed drawings and diagrams of available thermostat cases, devices for adjusting temperature controls, mounting brackets, and stuffing boxes.

Circle **Item 70** on Inquiry Card

FURNACE CLEANING EQUIPMENT — A complete selection of equipment for cleaning furnaces, boilers, and air conditioners is pictured in a four-page brochure issued by Premier Co., St. Paul, Minn. The two vacuum machines specified for this work are the heavy-duty Master-Vac (P-908F) and the low-cost Spic-Span (P-950H). Pictures and specifications of both units are included in the two-color brochure.

Circle **Item 71** on Inquiry Card

REGULATOR VALVE SIZING — Four-page Bulletin J-SC from Jordan Corporation, Cincinnati, Ohio, shows how to size OPW-Jordan Sliding Gate regulator valves. Technical data (applying to all makes of valves) tell how to adjust sizing for variations in pressure, temperature, viscosity, and specific gravity. Charts cover steam, liquid, and gas services. Cross-reference method of compiling eliminates need to use rulers or slide-rules.

Circle **Item 72** on Inquiry Card

COMMERCIAL BOILERS — Portmar Boiler Co., Inc., Brooklyn, N. Y., has made available a complete 12-page catalog of its commercial boiler line for the larger instalations. The catalog includes diagrams, descriptive literature, capacities and dimensions and trade prices for the boilers, ranging in size from 3,650 to 42,500 sq ft steam, and 5,840 to 68,000 sq ft water.

Circle **Item 73** on Inquiry Card

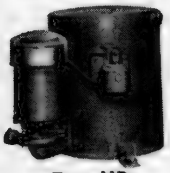
ELECTRODE INFORMATION—A seventy-page electrode pocket guide, No. ADC-650G, which contains information essential to anyone concerned with buying or using electrodes, is available from Air Reduction Sales Co., a division of Air Reduction Co., Inc., New York, N. Y. Among the many helpful features of the booklet is an electrode consumption calculator, in tabular form, which provides data for calculating consumption per linear foot in the welding of various types of joints.

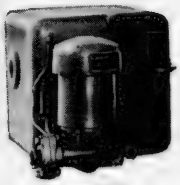
Circle **Item 74** on Inquiry Card

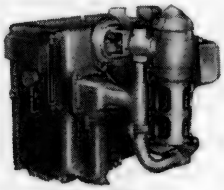
(Continued on page 142)

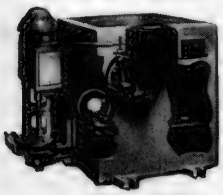
Type S
Condensate Pump

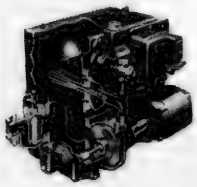
Type U
Condensate Pump


Type MR
Condensate Pump


Type ECR
Condensate Pump


Type VV
Vacuum Pump


Type E and EC
Condensate Pump


Type SVA
Vacuum Pump

Quality Pumps by SARCO

Complete Lines—Condensate and Vacuum

Undivided Responsibility by Sarco
for pumps and heating specialties

These pumps have the efficiency and rugged construction which insure top performance and long, trouble-free service. They are designed and built to Sarco's traditionally high quality standards.

To help you select the right Sarco condensate or vacuum pump for each job, the experienced Sarco-Sarcotherm engineering staff will gladly cooperate.

For Undivided Responsibility . . . specify and order from one "Complete Line" source . . . SARCO-SARCOTHERM . . . pumps, heating specialties, temperature regulators, finned-tube radiation and weather-compensated control systems.

Write for Pump Bulletin No. 1465

SARCO CO., INC. • SARCOTHERM CONTROLS, INC.
635 Madison Avenue, New York 22, N. Y.

2226-F

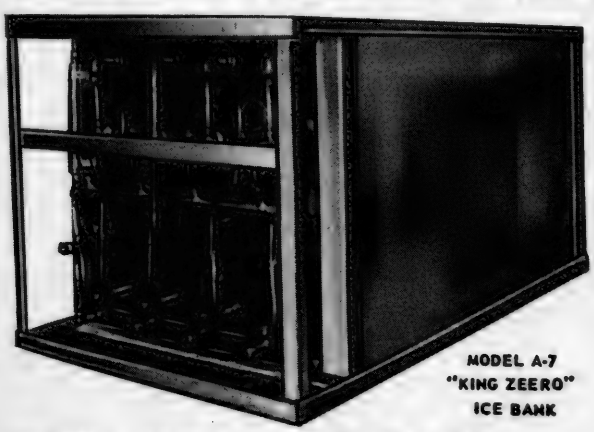
"King Zeero's" Sweet Water ICE BANKS offer ICE-CONCENTRATED Refrigeration for Air Conditioning

CONTINUOUS RIFLED GALVANIZED COILS
EXPANSION VALVE CONTROLLED

32°-34° COLD ICE WATER

DESIGNED FOR USE WITH:
FREON — METHYL CHLORIDE — AMMONIA

The "King Zeero" ICE BANK is designed for air cooling in Churches, Mortuaries, Theatres, Offices, Stores, Auditoriums, Factories, Clubs, Restaurants. etc. Ice Banks may be added to existing systems for increased capacity.



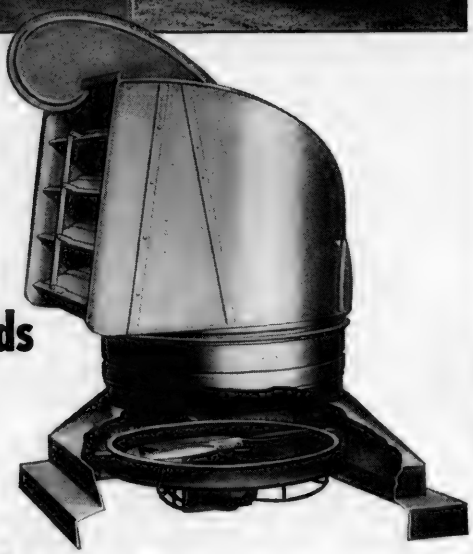
MODEL A-7
"KING ZEERO"
ICE BANK

CAPACITIES - 500 lbs. to 30,000 lbs. (72,000 B.T.U.'s to 4,320,000 B.T.U.'s) in a single unit. Multiple units may be installed.

The "King Zeero" ICE BANK is designed to deliver tons of 32 to 34 F. ice water for recirculation through air cooling coils. Peak loads many times compressor capacity are easily handled.

- DIRECTED COURSE OF WATER travels with "built-in" agitation.
- NO MECHANICAL AGITATION REQUIRED.
- LARGE WATER COMPARTMENTS spaced on 11" and 12" centers.
- 33% EXTRA ICE CAPACITY safely attained without freezing up.
- ICE IS "BURNED OFF" PLATE COILS progressively, exposing prime and secondary surface for maximum flash cooling capacity.
- ICE THICKNESS automatically controlled - eliminates "freeze ups."
- 94 SIZES to fit space requirements. Other designs for special applications.

THE KING ZEERO COMPANY
4300-14 W. Montrose Ave. - Chicago 41, Ill.
Manufacturers of Ice Builders - Ice Builder Cabinets - Ice Banks



How to handle ventilation needs that *vary*; use the *double duty* Swartwout *Airjector* Roof Ventilator

Here's the *adaptability* you've wanted in ventilating buildings where you have extra floods of heat or fumes at certain periods. Airjector gives you large capacity *power* expulsion when you need it, but saves power when the capacity requirement is less by acting as a *gravity* type ventilator. Its ball bearing *rotary mounting* increases efficiency at all times by keeping the discharge opening always downwind.

Airjector moves a large volume of air at low cost — combines economy and efficiency with pleasing appearance. Oversize outlet and curved head cut static resistance to a minimum. And any appreciable outside air currents passing around the head provide extra suction effect on the outlet area. Capacities for the 13 sizes, and many capacity variations, carry Certified Ratings under the standard test codes.

For peak loads — or for ordinary gravity ventilation — you pay only for what you need with this *double duty* method available in the Airjector. It's the answer for ventilation problems in many situations, such as welding shops, spray booths, heat treating rooms, forge shops, over pickling tanks, galvanizing and plating rooms, etc. Write for complete catalog data, Bulletin AJ-H.

THE SWARTWOUT COMPANY

18511 Euclid Avenue **Cleveland 12, Ohio**

Representatives in all Principal Cities

Swartwout ROOF VENTILATORS AND VENTILATING LOUVERS

ALSO AUTRONIC PROCESS CONTROL EQUIPMENT

NEW CATALOGS

(Continued from page 140)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

CLAY PIPE AND PRODUCTS—A new eight-page quick reference catalog, entitled Design With Confidence — Build With Pride, A.I.A. File 5-K, has been published by the Robinson Clay Product Co., Akron, Ohio. This pocket-size, two-color catalog is a new quick reference for architects, builders, and plumbers, illustrating typical installations of sanitary systems, masonry walls, fireplaces and furnaces, and under-floor heating systems using clay pipe or allied clay products.

Circle **Item 75** on Inquiry Card

INSTRUMENT AIR DRYERS — Anders-Lykens Corp., a Division of Milton Roy Co., Philadelphia, Pa., has published Bulletin 857, entitled Instrument Air Dryers. This 4-page, 2-color bulletin describes adsorptive type, automatically regenerated dryers with capacities to 125 standard cfm at 90 deg F and 100 psig. The bulletin describes and illustrates the operation of the dryers and contains complete specifications including a sizing nomograph.

Circle **Item 76** on Inquiry Card

PVC CENTRIFUGAL FANS—The operation, specification and performance of a new series of polyvinyl chloride (PVC) centrifugal fans, designed for blower installations requiring high chemical resistance and wide temperature range, are presented in a 4-page brochure prepared by the Chicago Blower Corp., Franklin Park, Ill. The bulletin, PVC 101, describes and illustrates the use of rigid, unplasticized PVC material in five centrifugal fan models ranging in size from 9½ to 40 inches.

Circle **Item 77** on Inquiry Card

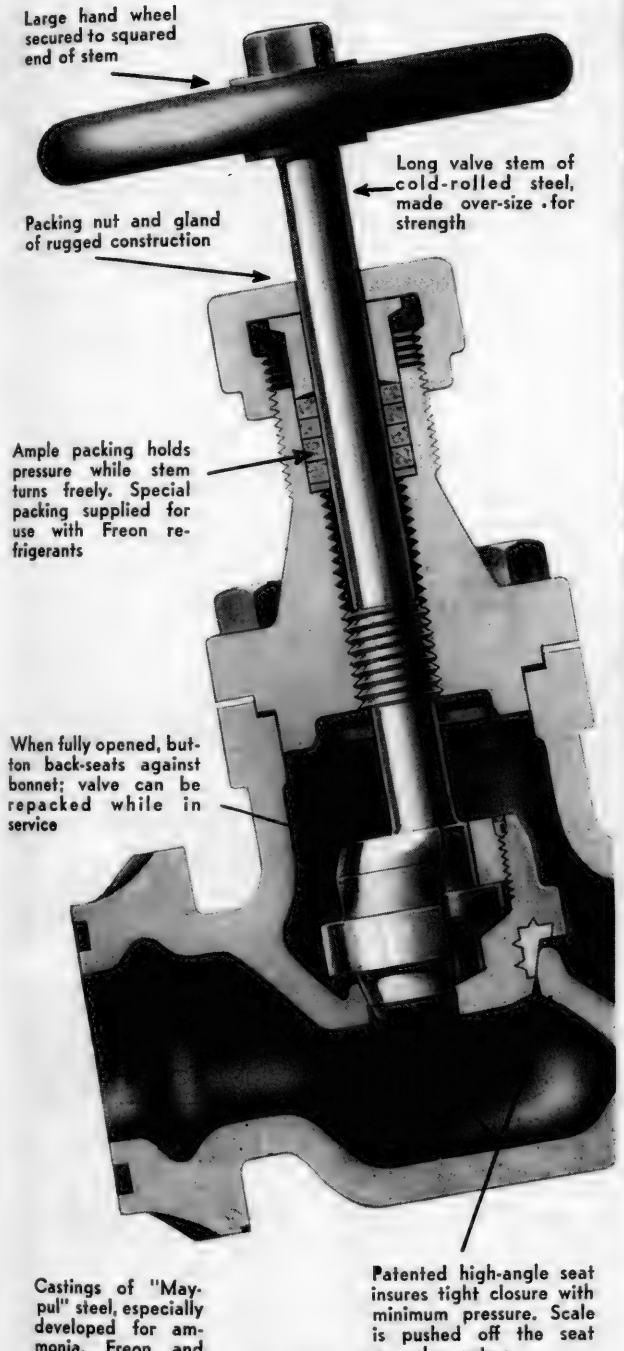
HEAT PUMP VALVES, CONTROLS — A 20-page booklet, No. 1687, describing valves and controls designed and produced by Ranco Inc., Columbus, Ohio, for completely automatic operation of heat pumps, is available from the company. The book includes details, specifications, and operational features of valves and controls offering automatic operation for both window units and central systems. Most important of the components is the company's D50 automatic de-icer, described by the company as the only control which operates solely on the accumulation of ice on outside coils and which quickly and completely removes ice and automatically returns the heat pump to the heating phase in three to five minutes.

Circle **Item 78** on Inquiry Card

(Continued on page 144)

FRICK

Valves are Superior for Refrigeration and Other High-Pressure Services


Large hand wheel secured to squared end of stem
Long valve stem of cold-rolled steel, made over-size for strength
Packing nut and gland of rugged construction
Ample packing holds pressure while stem turns freely. Special packing supplied for use with Freon refrigerants
When fully opened, button back-seats against bonnet; valve can be repacked while in service
Castings of "Maypul" steel, especially developed for ammonia, Freon and high-pressure work
Patented high-angle seat insures tight closure with minimum pressure. Scale is pushed off the seat as valve enters

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

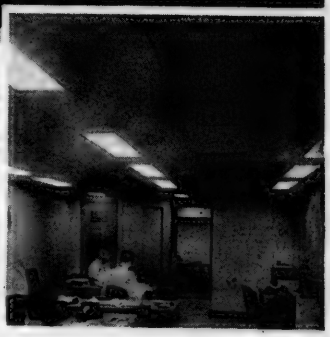
WAYNESBORO, PENNA., U. S. A.

NEW ECONOMY IN RADIANT HEATING...

... is now possible with the completely integrated SIMPLEX radiant-acoustical ceiling.

One trade rapidly installs this *one* completely integrated ceiling which includes all radiant ductwork, aluminum acoustical panels, diffuser panels and framing for recessed fixtures. *One* medium, air, is responsible for heating, cooling, ventilation and humidity control.

The result is a system which combines the speed of response and installation economy of forced air systems with the superior comfort of radiant heating and cooling—at prices which have competed successfully with quality conventional forced air systems of heating and air conditioning.



(Above) Some 30,000 sq. ft. of SIMPLEX radiant-acoustical ceiling help keep patients in the new Beckley Memorial Hospital, Beckley, W. Va., comfortable. Archt: Isadore Rosenfield, Engr: John D. Dillon, both of N. Y.

(Right) Attractive anodized aluminum ceiling surface is free of conventional air diffusers and dirt rings. Station Master's Office in Grand Central Station, N. Y.

Send today for AIA booklet containing photographs, details and specifications.

SIMPLEX CEILING CORP.

552 W. 52 St., New York 19, New York

Please send me folder 39b describing your radiant-acoustical ceiling.

Name .....

Firm .....

Address .....

City ..... Zone..... State.....

for FUME

CONTROL

install

FLEXAUST® HOSE

Made of strong neoprene coated cotton or nylon fabrics spiral wire reinforced.
For *all* kinds of fume and dust control, and ventilation uses.
Extremely flexible, durable, and lightweight.
Exceptionally easy to cut, install, connect, reuse, and relocate.
Sizes 1¼" thru 36" i.d.

Write for details today
Distributors in all principal cities

THE FLEXAUST COMPANY
Dept. HV-11
100 PARK AVE. NEW YORK 17, N. Y.

NEW CATALOGS

(Continued from page 142)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

UNIT VENTILATOR COLOR GUIDE — A color guide, Bulletin 600-E3A, for the selection of the best combinations of colors and laminated plastic patterns for Herman Nelson unit ventilator products is available from American Air Filter Co., Inc., Louisville, Ky. Seven true color paint samples are included for school unit ventilators and cabinets, along with recommended color combinations and reflective factor of each color. Five full color samples of Formica laminated plastic for top surfaces are also shown. All color patterns are available from stock, according to the manufacturer, and may be used alone or in combinations.

Circle **Item 79** on Inquiry Card

FLUSH VALVES — Sloan Valve Co., Chicago, Ill., is distributing its new Catalog & Data Manual No. 60. This 64-page reference book contains more than 150 product illustrations and cutaway views of the company's flush valves and available style variations, together with detailed descriptions, technical data and information on specifying and ordering. Its pages also carry more than 100 diagrams showing installation dimensions.

Circle **Item 80** on Inquiry Card

EVAPORATIVE CONDENSERS — Baltimore Aircoil Co., Baltimore, Md., has published a 4-page bulletin describing their latest line of propeller fan evaporative condensers, from 75 to 350 tons. The bulletin fully describes the blow-through propeller fan arrangement, which is recommended for applications where minimum horsepower is essential.

Circle **Item 81** on Inquiry Card

STAINLESS STEEL, NYLON PRODUCTS —Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y., has issued a 138-page catalog which will simplify the work of engineers, buyers, and cost estimators. This catalog contains price, stock and delivery information on the company's lines of stainless steel and nylon fastenings.

Circle **Item 82** on Inquiry Card

GAS-FIRED INCINERATORS—A manual of recommended practices for the installation of domestic gas-fired incinerators has been reprinted by the incinerator division of the Gas Appliance Manufacturers Association, 60 East 42nd St., New York 17, N. Y. The manual, produced by the division's technical committee, gives detailed instructions, with diagrams, covering the installation of gas incinerators, gas piping, flues and vents. It also includes instructions on incinerator operation and maintenance. Copies of the 12-page booklet are available at 15 cents a copy.

M-PEL-AIR

OFFERS YOU

CONTEMPORARY DESIGN

and sleek, low, roof-hugging silhouette.

WHISPER-QUIET, HEAVY DUTY PERFORMANCE

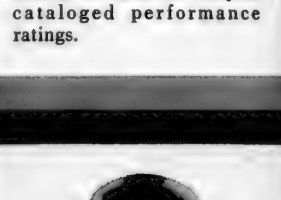
M-Pel-Air wheel is statically *and* dynamically balanced. Rugged, heavy gauge, all aluminum construction and precision assembly withstands constant, most abusive operation.

EASIEST TO INSTALL EASIEST TO SERVICE

Shipped completely assembled, ready to install. Removal of 4 cap nuts provides access to *entire* assembly for wiring and service.

FULL RATED CAPACITIES

All M-Pel-Air units are guaranteed to meet or surpass cataloged performance ratings.



THE NEW M-PEL-AIR

THE NEW LOOK IN POWER EXHAUSTERS

Manufacturers agents' inquiries invited

BROOKSIDE CORPORATION

McCordsville, Indiana

FLEXIBLE CUSHION COUPLING — A twelve-page bulletin describes Paraflex, a flexible cushion coupling just introduced by Dodge Manufacturing Corp., Mishawaka, Ind. Full page of general information explains how the coupling, by means of rubber tire element, accommodates angular misalignment, parallel misalignment and end float, singly or in any combination, besides cushioning shock loads and diminishing torsional vibration. Several pages are devoted to tables with engineering data to facilitate selection of couplings for many applications.

Circle **Item 83** on Inquiry Card

DUST COLLECTION, CONTROL—"How much are you paying for dust?" is the theme of a two-color publication just issued by Torit Manufacturing Co., St. Paul, Minn. The illustrated piece of literature explains the economies of dust control with the company's unitized dust collectors through reduced capital expenditure, operating time, and machine operating costs, and an increase in employee efficiency.

Circle **Item 84** on Inquiry Card

THERMOSTATIC EXPANSION VALVES—Six new bulletins on A-P thermostatic expansion valves are released by the Controls Company of America, Milwaukee, Wis. These bulletins offer complete technical information on the full line of A-P valves with special emphasis on thorough mechanical data to simplify proper selection. Six of the bulletins are two page sheets which cover six different valves ranging from ¼ ton to 19 ton capacities for a wide range of refrigerants. New valve applications developed in the automotive air conditioning field are also covered with special tables listed to help identify these products. Many standard plus other special applications for these valves are described.

Circle **Item 85** on Inquiry Card

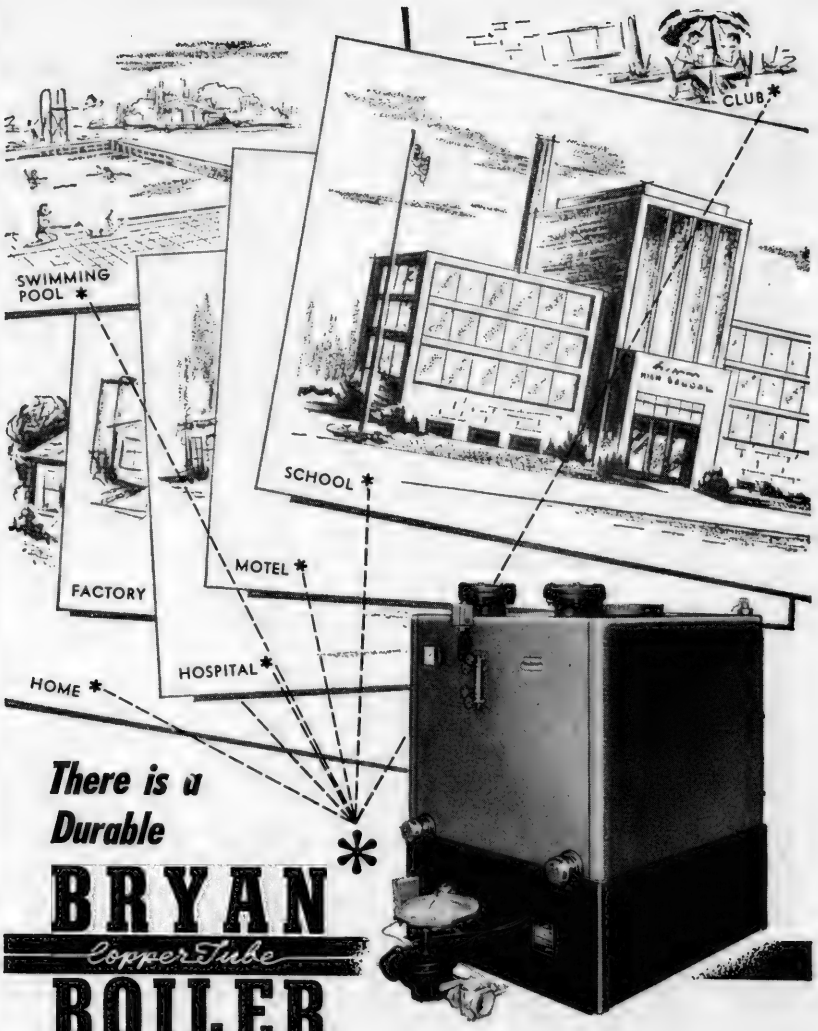
ANGLE IRON SHEAR—A bulletin is available from Whitney Metal Tool Co., Rockford, Ill., containing complete information on the company's No. 4 angle iron shear capable of cutting 2 x 2 x ¼ inch stock. The bulletin also describes two allied tools, a bender and a notcher and how the three tools can be combined on one stand requiring a total floor space of 21½ by 26 inches. Bulletin gives complete dimensions and capacities including prices.

Circle **Item 86** on Inquiry Card

ELECTRONIC OIL BURNER CONTROLS—Electronic controls available on U.S.-Carlin oil burners in conformance with recent UL regulations are completely described in the latest issue of Facts 'n Figures, quarterly publication of The Carlin Company, Wethersfield, Conn. In addition to explaining the functions of various controls, the bulletin gives wiring diagrams, tables of recommended controls based upon firing rate, and control sets available for each model in the line according to type of mounting.

Circle **Item 87** on Inquiry Card

(Concluded on page 146)



There is a Durable

BRYAN *Copper Tube* **BOILER**

For every steam or water heating application up to 1,800,000 B.T.U. output.

Whether the plans on your boards are for a factory, apartment house, swimming pool or a modest radiant heat home, a detailed check on specifications will point to one of the many Bryan models covering low or high pressure steam, hot water boilers, or indirect water heaters.

The Bryan is a heavy duty, durable boiler made to deliver a lot of B.T.U's in a short period of time. Specially engineered for gas or oil heating, its high efficiency is complemented by years of trouble free service. Requires minimum floor space.

Bryan is the originator of the famous Bryan copper tubes. They are used in both direct and indirect heating units for fast action and elimination of scale deposits.

Bryan Gas Fired Boilers are designed and built to the requirements of the A.S.M.E. code and are also approved by the American Gas Association (A.G.A.)

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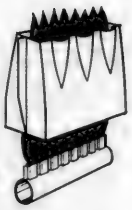
BRYAN STEAM CORPORATION • Peru, Indiana

So beautiful! So efficient!

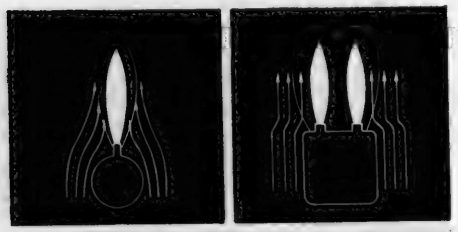
Magnificent MODINE gas unit heater

☆ Years ahead in styling
☆ Years ahead in performance

Modine gas-fired unit heaters' distinctive modern lines are enhanced by the perfect blending of sparkling chrome and a restful gray-green finish. It's a great performer too . . . gives you instant heat, long-lasting service. And because Modines are up to 50% lighter, they cost less to ship and install. Eight AGA-approved sizes are available from 25,000 to 310,000 Btu.

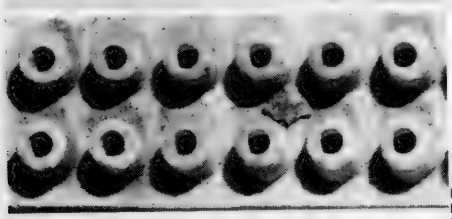


FAST, UNIFORM HEAT. Continuous, even flame from front to rear of individually and directly fired tubes boosts radiant heat absorption and uniform heat distribution.

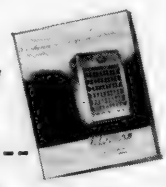


MAXIMUM COMBUSTION EFFICIENCY is delivered by Modine design (far left) because adequate air supply is assured. Contrast this with the conventional double-row arrangement shown.

SELF-CLEANING PORTS. Knife-sharp Modine stainless steel ports (left) have four times the free area of drilled ports (left below). Keen edges resist lodging of dirt and scale . . . permit clean, steady burning.



See the Modine representative listed in your classified phone book or use this handy coupon.



Modine MANUFACTURING COMPANY

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Name.....

Firm.....

Address.....

City.....Zone....State.....

GU-1347

NEW CATALOGS

(Concluded from page 145)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

WATER HEATER RELIEF VALVES—The whys and wherefores of temperature and pressure relief valves for domestic water heaters are described in catalog, PV-C-415, published by The Patrol Valve Co., Cleveland, Ohio. Entitled Water Heater Relief Valves, this catalog explains the function of these valves, what causes them to operate, and why they may operate (and perform their function) when they apparently should not do so.

Circle **Item 88** on Inquiry Card

MOLDED MECHANICAL RUBBER — Bonding of molded mechanical rubber to metal (including aluminum), compounding of rubber for tailor-made jobs, and uses of metals when cushioned with rubber where metal-on-metal cannot be used, are described in a new 24-page, illustrated booklet available to manufacturers and design engineers from Henry Engineering Company, Moline, Ill.

Circle **Item 89** on Inquiry Card

CUSHIONED VALVE APPLICATION — Cushioned Valves in Action is a new 4-page bulletin published by Golden-Anderson Valve Specialty Co., Pittsburgh, Pa. Schematically shown are various piping and valve arrangements for particular applications, such as supply water to mill, accurate water level control in reservoirs, emergency fire protection, and isolating part or all of a system.

Circle **Item 90** on Inquiry Card

INDUSTRIAL STEEL PRODUCTS—An 8-page general bulletin describing the facilities and products of the company has been published by American Steel Band Co., Pittsburgh, Pa. Included in this bulletin are brief descriptions of their various industrial and commercial building products, including roof ventilators, cellular flooring, and insulated wall panels, as well as representative installations, and addresses of their various sales offices and representatives.

Circle **Item 91** on Inquiry Card

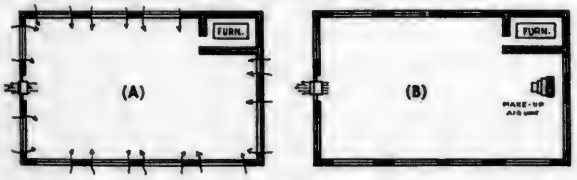
EXTRUDED NYLON SHAPES — A new folder which incorporates actual samples of extruded Plaskon Nylon has been prepared for engineers and designers in the air conditioning field. The extrusions suggest new engineering opportunities now possible with the material, properties of which are presented in chart form. The folder is available to engineers and designers upon request on company letterhead to Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

MODEL 48MU210
48" 4-blade unit
equipped with elbow

Aerovent INDUSTRIAL AIR MAKE-UP UNITS

Performance of fans and ventilating equipment installed to exhaust from production and processing areas depends *entirely* upon the availability of ENOUGH AIR! Without sufficient quantities to replace air exhausted, the air-handling system is soon "starved," creating a negative pressure or "vacuum" condition which is responsible for infiltration of outside air around doors and windows. The effect of the resulting draft places an additional work load on the plant heating system, with an ultimate decline in temperatures throughout the working area.

here's a typical "MU" installation



Warm air, exhausted from a machine shop area, replaced by cold air pulled through cracks and door openings (A). Filtered and tempered air, supplied by Air Make-Up Unit installed in same area (B) helps to maintain constant temperatures; levels-off "peaks" and "valleys" in boiler or furnace loading.

New Aerovent Industrial Air "Make-Up" Units, designed to supply ample quantities of clean, pre-heated air, aid in maintaining peak fan performance, reducing drafts and in stabilizing uniform heating loads. Available in seven unit arrangements in sizes 24" to 54" for capacities to 33,000 CFM. Write for free Bulletin 850.

All Aerovent Fans are rated in accordance with the Standard Test Code and U.S.D.C. Comm. Std. CS178-51

Certified Ratings

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Ash and Brandt Sts. • Piqua, Ohio

Slot STRIPLINE DIFFUSERS by AGIAIR® Slot

Type F

STRIPLINE combines the best features of both slots and efficient air diffusers to provide equalized air flow throughout its entire length.

STRIPLINE slot diffusers are slenderly designed, inconspicuous, practical and versatile. These slot diffusers can be located in walls, ceilings, coves, moulds, window reveals and stools or almost anywhere to suit interior design.

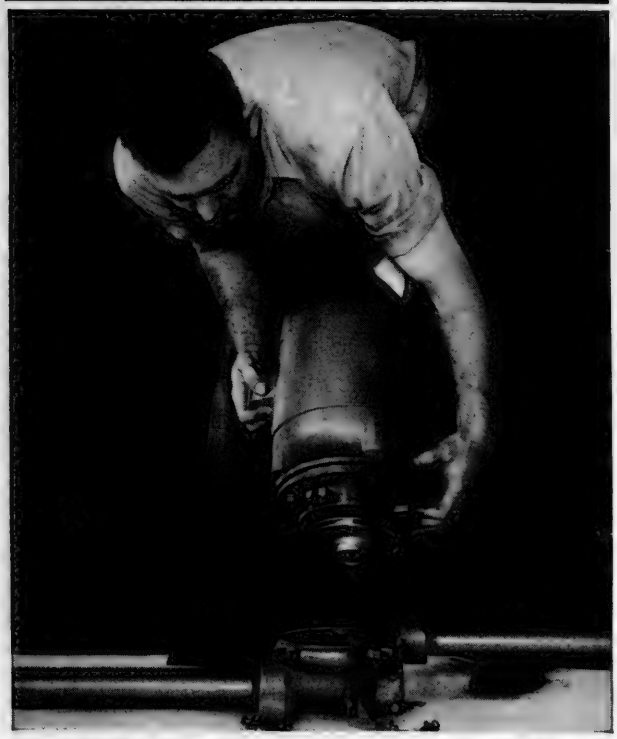
Type S

Type H

Write for complete Stripline Catalog.

AIR DEVICES INC. • 185 MADISON AVENUE • NEW YORK 16, N. Y. • AIR DIFFUSERS • FILTERS • EXHAUSTERS

So easy to handle, so compact

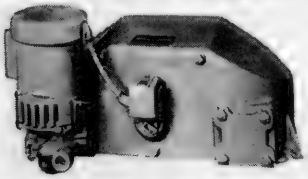


Type SCC Hot Water Pump can be completely disassembled by removing only 4 bolts.

... you know it's a Wheeler-Economy Pump!

Engineers have chosen Wheeler-Economy Pumps hundreds of thousands of times for heating and air conditioning systems. They're compact, easy to install and maintain, and give many years of dependable service. Operation is smooth and quiet... design and construction are top quality.

SCC HOT WATER AND AIR CONDITIONING CIRCULATING PUMPS are space-saving vertical design, yet can be installed horizontally. Ideal for any type package equipment requiring small pumping units. Bronze-fitted with close-grained cast iron casing and motor stand. Bronze impellers dynamically balanced, hand-fitted. Highest quality mechanical seals for leakproof operation.



CONDENSATE RETURN PUMPS have capacities of 2000-8000 sq. ft. EDR, handle condensate to 200°F. Can be operated over wide pressure range without overloading motor. Close-coupled. Easy installation—no sub-base. Disassemble quickly without disconnecting piping. Convert to duplex operation simply by removing blind flange and adding motor and mechanical alternator.

Economy Pump Division

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Please send free information on your heating and air-conditioning pumps.

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CITY ZONE

STATE

Centrifugal, Axial and Mixed Flow Pumps • Steam Condensers • Vacuum Equipment • Marine Auxiliary Machinery • Nuclear Products

(Continued from page 134)

heat transfer at high velocities, and the analogy between electrical and thermal circuits for convective heat transfer. There is about a 25% increase in the number of problems.

It includes an expanded chapter on heat transfer in condensing and boiling, a concise section on gas radiation, and new material on mass transfer and the similarity between heat and mass transfer.

Elements of Heat Transfer, 3rd edition, by M. Jakob and G. A. Hawkins. Cloth bound, 6 x 9 inches, 317 pages. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. Price, $6.75.

CIVIL ENGINEERING PRACTICE

Volume 3 of a three-volume set on American Civil Engineering Practice, edited by Robert W. Abbett, member of the firm of Tippets-Abbett-McCarthy-Stretton, consulting engineers, has just been published. It replaces the American Civil Engineers' Handbook which was first published in 1910.

This volume has sections on theory of structures; masonry and plain concrete; reinforced concrete; prestressed concrete structures; footings, piers and abutments; retaining walls; steel bridges; reinforced-concrete bridges; buildings; steel towers, masts, tanks, bunkers, bins; light gage steel construction; reinforced concrete chimneys, silos, bins, elevators, tanks and turbine foundations; timber structures; earthquakes and earthquake resistant design.

Each of the chapters in the sections is written by an engineer considered a specialist in that field.

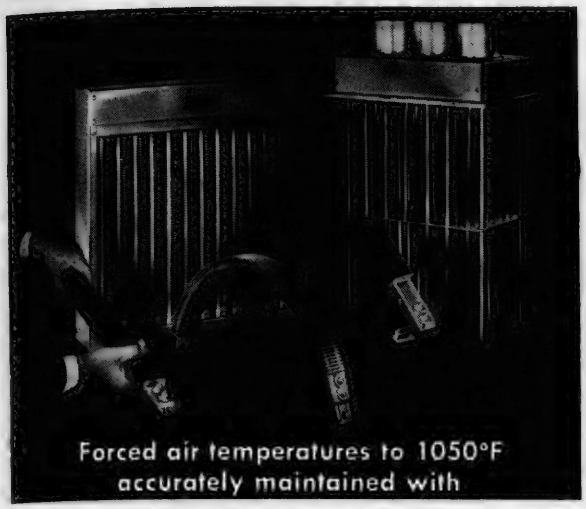
American Civil Engineering Practice—Vol. III, edited by R. W. Abbett. Limp binding, 5½ x 8¼ in. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. Price, $25.

• • •

COMMERCIAL HEATING PLANT SPECIFICATIONS—Bituminous Coal Institute has issued Guide Specifications for Typical Low-Pressure Commercial Heating Plant. This 53-page booklet is for a design heating load of 20,000 EDR or 4.8 million Btu per hour. By adjusting boiler, stoker and bin size up or down, the basic recommendations on layout and type of equipment can be used for most heating plants of a range of 3,000 to 24,000 EDR or about ¾ to 5½ million Btu per hour. Bituminous Coal Institute, Southern Building, Washington 5, D. C.

MANUAL OF SEPTIC TANK PRACTICE—Based on extensive studies carried on at the Robert A. Taft Sanitary Engineering Center, this manual has been prepared as a guide to health officials and building officials. The manual is complete with diagrams and tables. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, 25 cents.

(Book Reviews concluded on page 150)



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CHROMALOX *Electric* Air Duct Heaters

For heating air under forced circulation, Chromalox Electric Air Duct Heaters are the efficient, economical answer.

For space heating or for adapting your present air-conditioning systems for central heating.

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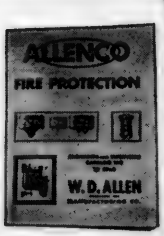
This time-proved line *more* than meets specifications. It meets the highest standards of safety plus design, practicality and economy.

Write for Allen 150 (A.I.A. file 29e2) and nearby counsel . . .



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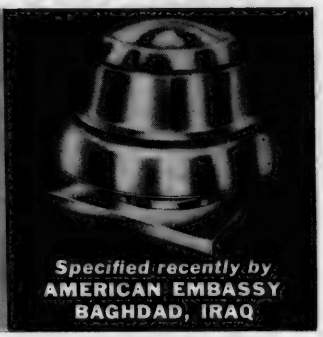
PENN DOMEX ROOF EXHAUSTERS..



. . feature . . Skyline Stylishness . . High Performance . . and durable, bright aluminum housings.

Domexes recent development is the "Significant Scroll", a deep, one-piece spun inlet — exclusive with Penn RB and QB series — providing *proper design*, quiet operation and certified capacities . .

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. . A factory fabricated roof curb combining structural stability and sound attenuating quality definitely superior to field constructed curbs. The Sonotrol is priced competitively with on-the-job constructed curbs, it also defines and stabilizes dimensions. It is an excellent companion piece for all motor driven exhausters. The Penn Ventilator Man in your area has complete details. Contact him for a copy of the Electrical Testing Laboratories' report on the Sonotrol Curb.

Detailed information on the Domex and Sonotrol Curb is available from your local representative or write direct.

PENN VENTILATOR CO.
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Representatives and Distributors in Principal Cities.
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you want 'em? we got 'em!

28 FULL LINES!

d-h AIR CONDITIONING

SPOTAIRE ROOM-by-ROOM AIR CONDITIONERS: #1 d-h LRC's: basic unit, concealed or deluxe cabinet; 4 models, 200 thru 600 cfm. #2 d-h VRC's: concealed or deluxe consoles; 3 models. 200 thru 600 cfm. #3 d-h HRC's: 3 suspended types, 19 models, 300 thru 1750 cfm.

AIR HANDLING UNITS: #4 d-h HH Series: ceiling suspended. #5 d-h HHV Series: floor mounted. Both: 14 models, 624 thru 28000 cfm.

VENTILATING UNITS: #6 d-h AM: 1752 thru 32250 cfm.

MULTIZONE TYPES: #7 d-h FLEXAZONE: for simultaneous, independent, variable heating, cooling, ventilating; 1752 thru 32250 cfm.

PACKAGED AIR CONDITIONERS: #8 d-h AECR: with built-in evaporative condenser. #9 d-h SCR: with water-cooled condenser. Both, 7½ thru 75 H.P.

PACKAGED STORE COOLERS: #10 d-h DYNA-PAC & ROYALAIRE: 2 thru 15 tons.

PACKAGED WATER CHILLERS: #11 d-h CWG: 7½ thru 75 H.P. #12 d-h CWG-E: attached evaporative condenser. Both 7½ thru 75 H.P.

EVAPORATIVE CONDENSERS: #13 d-h PERMA-FAN: 13 models; 5 thru 110 tons.

COILS: #14 Extended surface; steam, water, DX #15 Type "H"; small applications, DX or chilled water.

PACKAGED WATER CHILLERS: #16 d-h AC; air cooled. #17 d-h WC: water cooled. Both, 2, 3, 5 H.P.

COOLING TOWERS: #18 d-h WMT: 13 models, 5 thru 100 tons.

AIR-COOLED CONDENSERS: #19 d-h ACC: 5 models, 2 thru 20 tons.

COMMERCIAL REFRIGERATION:

#20 d-h FLOCOLD UNIT COOLERS: 750 thru 6000 cfm. #21 d-h FLOCOLD: 7 models, 750 thru 6000 cfm. #22 under 34° F; water defrost ammonia; 6000 cfm. #23 d-h SPASAVER; WALK-IN 7 models, 750 thru 4400 cfm. #24 d-h AUTOMATIC ELECTRIC DEFROST; under 6000 cfm. #25 d-h HRC; MEAT ROOM UNITS. 14 models, 500 FLOCOLD HOT PAN; LIQUOR/ 750 thru 6000 cfm. d-h FLOCOLD (FT & CT; models; 1814 to 37325 SAVER: kit to

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CABLE: FORTRADE LOS ANGELES

Book Reviews *(Concluded from page 148)*

DESIGN OF A HEAT PUMP BURIED COIL—The Texas Engineering Experiment Station has issued Bulletin 139 on The Design of a Heat Pump Buried Coil, by Donald M. Vestel, Jr., and Billie J. Fluker. It covers a procedure for utilizing a basic equation to obtain the appropriate length and configuration of the buried coil in a heat pump installation employing the earth as the heat source and sink. Texas Engineering Experiment Station, The Texas A. and M. College System, College Station, Tex.

DIMENSIONS OF FERROUS VALVES—A standard on Face-to-Face and End-to-End Dimensions of Ferrous Valves has been issued as a standard designated as ASA B16.10-1957. This is sponsored by the Mechanical Contractors Association of America, Manufacturers Standardization Society of the Valve and Fittings Industry, and The American Society of Mechanical Engineers. For sale by The American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.

Canadian Degree-Days for September, 1957*

City	September		Cumulative	
	1957	Normal**	1957	Normal**
Calgary, Alta.	328	410	328	410
Charlottetown, P. E. I.	219	240	219	240
Crescent Valley, B. C.	276	330	276	330
Edmonton, Alta.	295	440	295	440
Fort William, Ont.	419	370	419	370
Grande Prairie, Alta.	316	450	316	450
Halifax, N. S.	168	190	168	190
London, Ont.	191	150	191	150
Medicine Hat, Alta.	244	300	244	300
Moncton, N. B.	250	260	250	260
Montreal, P. Q.	162	190	162	190
North Bay, Ont.	333	320	333	320
Ottawa, Ont.	194	200	194	200
Penticton, B. C.	135	200	135	200
Prince George, B. C.	351	460	351	460
Quebec City, P. Q.	275	290	275	290
Regina, Sask.	358	370	358	370
St. John, N. B.	280	360	280	360
Saskatoon, Sask.	353	380	353	380
Timmins, Ont.	456	410	456	410
Toronto, Ont.	140	154	140	154
Vancouver, B. C.	147	220	147	220
Victoria, B. C.	167	230	167	230
Windsor, Ont.	138	120	138	120
Winnipeg, Man.	381	311	381	311

* These data are supplied through the courtesy of the Meteorological Division Air Service Branch, Department of Transport, Canada.
** New normal figures covering 30-year period, 1921 to 1950.

COMING EVENTS

Where listed, names or titles of individuals are those from whom further information is available

AIR POLLUTION CONFERENCE—Air Pollution Conference to be held in Chicago, Ill. Headquarters not yet announced. Co-sponsored by Armour Research Foundation and the Midwestern Air Pollution Prevention Association. Conference secretary of Armour Research, 10 W. 35th St., Chicago 16, Ill. .....**NOVEMBER 13-14, 1957.**

(Continued on page 152)

ONE doesn't fit ALL needs!

Get *Airsan* Filters
ENGINEERED TO FIT THE JOB — RIGHT EVERY TIME

No filter does all jobs, meets every need. That's why Airsan Filters are engineered to the job to offer more effective dust collection. Airsan's expanded metal face plate acts as a lint arrestor to provide easier cleaning and servicing. It distributes air easily over the entire filter area. Provide high filtering efficiency and dust holding capacity with less resistance. Features include all galvanized construction and welded lock corners. Write for data.

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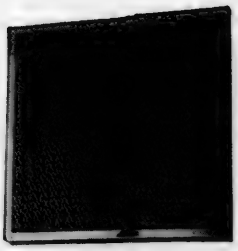
AFI MEMBER AIR FILTER INSTITUTE

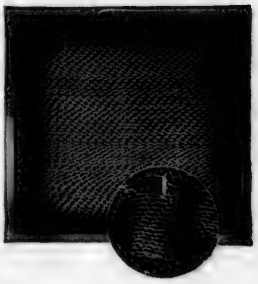
AIR FILTERS
(Low Velocity)

Viscous type, permanent and cleanable designed for industrial, commercial and domestic use. Available in 1" and 2" thickness.



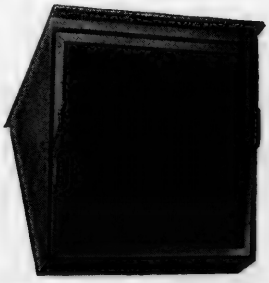
VIRO-CRIMP
(High Velocity)

Has a specially designed high velocity Viro-Crimp filter core. Hemmed edges provide a safety feature. Operates efficiently at 300 to 500 fpm. Available in 2" and 4" thickness.



GREASE FILTERS

Permanent, cleanable type Airsan Grease Filters made especially for range canopies, galleys, kitchens. Available in 2" thickness.



Air Filter Corporation

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NEW WEATHER RESET TIME SWITCH

OUTDOOR TEMPERATURE SELECTS COMFORT HEATING HOURS

Only the new Weather-Chron provides for independent comfort hour settings — separate for every day of the week!

WEATHER-CHRON EXCLUSIVES!

- Switching time to day-thermostat is automatically advanced with each degree drop in outdoor temperature.
- When outdoor temperature drops below the selected night dial setting, the day-thermostat controls heat flow at night as well as during the day.
- When outdoor temperature rises above the selected cut-off dial setting, all heat flow stops.

Available with 20 hours of spring carry-over

Each degree change in outdoor temperature automatically changes heating starts and stops.

Write for complete model information

AUTOMATIC DEVICES CO., INC.
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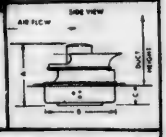
NEW CENTRIFUGAL IN-DUCT HUMIDIFIER
MORE COMPACT — INSTANT ACTION
HONEST HUMIDIFICATION FOR REAL WINTER AIR CONDITIONING



Walton has the only complete line of humidifiers—engineered to any type job. Technical information on how this equipment can be applied to your specific air conditioning problem on request.

Walton

AUTHORITIES ON HUMIDIFICATION SINCE 1930

Send data on the in-duct humidifiers developed by Walton. Want more details on the product, the application, and how I can develop this new business. No obligation.

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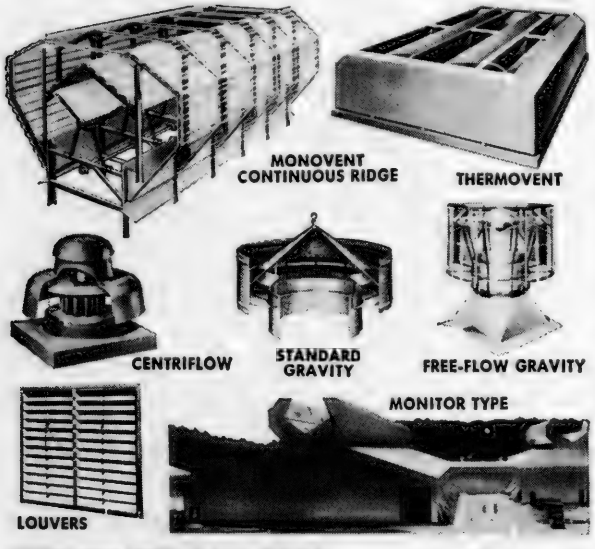
Name of Company.....
Address.....
City.....Zone.....State.....
Type of business....Architect....Engineer....Contractor

Walton Laboratories, Inc., Dept. AH-11, Irvington 11, N. J.

IF YOU HAVE VENTILATORS ON YOUR MIND SEE BURT



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BURT'S complete ventilator line includes a type and size to put air to work most efficiently and economically for your specialized needs. BURT'S engineering skill and know-how from more than half a century designing and building ventilators is your assurance of satisfaction. Your inquiry will receive prompt and qualified attention.

FAN & GRAVITY VENTILATORS LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

49 E. South St., Akron 11, Ohio

MEMBER POWER FAN MANUFACTURERS ASSOCIATION

(Continued from page 150)

CONSULTING ENGINEERS COUNCIL—Board of Directors' meetings of the Consulting Engineers Council at the Abraham Lincoln Hotel, Springfield, Ill. Office of the executive secretary, 726 Reisch Building, Springfield, Ill. ....**NOVEMBER 15-17, 1957.**

ASRE MEETING—Semi-annual meeting of the American Society of Refrigerating Engineers, at the Hotel Shoreland, Chicago, Ill. Secretary of the Society, 234 Fifth Ave., New York 1, N. Y. ....**NOVEMBER 14-16, 1957.**

REFRIGERATION CONTRACTORS CONVENTION—Annual convention of the Refrigeration and Air Conditioning Contractors Association, Inc., at the Drake Hotel, Chicago, Ill. Secretary of the Association, 10660 Carnegie Ave., Cleveland 6, Ohio. ....**NOVEMBER 16-18, 1957.**

REFRIGERATION WHOLESALERS MEETING—Annual meeting, Air Conditioning and Refrigeration Wholesalers, Sheraton Hotel, Chicago, Ill. Secretary, 2607 N. High St., Columbus, Ohio. ....**NOVEMBER 16-18, 1957.**

AIR POLLUTION CONTROL CONFERENCE—Semi-annual Technical Conference of the National Air Pollution Control Association, at the Fairmont Hotel, San Francisco, Calif. B. Linsky, conference chairman, Bay Area Air Pollution Control District, 1480 Mission, San Francisco, Calif. .....**NOVEMBER 18-19, 1957.**

AIR-CONDITIONING AND REFRIGERATION EXPOSITION — 10th exposition of the Air-Conditioning and Refrigeration industry, sponsored by the Air-Conditioning and Refrigeration Institute, at Chicago's International Amphitheatre, Chicago, Ill. Secretary of the Institute, 1346 Connecticut Ave., N. W., Washington 6, D. C. .....**NOVEMBER 18-21, 1957.**

WARM AIR HEATING—Annual convention, National Warm Air Heating and Air Conditioning Association, Hotel Morrison, Chicago, Ill. George Boedener, Secretary, NWAHACA, 640 Engineers Bldg., Cleveland, Ohio .....**NOVEMBER 18-22, 1957.**

ASME MEETING—Annual meeting of the American Society of Mechanical Engineers, at the Hotel Statler, New York, N. Y. Secretary of the Society, 29 W. 39th St., New York, N. Y. .....**DECEMBER 1-6, 1957.**

HOME BUILDERS EXPOSITION—14th annual convention-exposition of the National Association of Home Builders of the United States, at the Conrad Hilton and Sherman hotels, and the Chicago Coliseum, Chicago. Secretary of the Association, 111 W. Jackson Blv'd., Chicago 4, Ill. .....**JANUARY 19-23, 1958.**

ASHAE WINTER MEETING — 64th annual meeting, American Society of Heating and Air-Conditioning Engineers at the Penn Sheraton Hotel, Pittsburgh, Pa. A. V. Hutchinson, secretary ASHAE, 62 Worth St., New York, N. Y. .....**JANUARY 27-29, 1958.**

NACE CONFERENCE—14th annual conference of the National Association of Corrosion Engineers, at the Civic Auditorium, San Francisco, Calif. A. B. Campbell, executive secretary of the Association, 1061 M & M Bldg., Houston 2, Texas. **MARCH 17-21, 1958.**

NUCLEAR CONGRESS—1958 Nuclear Engineering and Science Conference in Chicago, Ill. Engineers Joint Council, 29 W. 39th St., New York 18, N. Y. .....**MARCH 17-21, 1958.**

JOINT ASHAE-ASRE MEETING—Joint summer meeting, American Society of Heating and Air-Conditioning Engineers and American Society of Refrigerating Engineers, Hotel Leamington, Minneapolis, Minn. A. V. Hutchinson, secretary of the ASHAE, 62 Worth St., New York 13, N. Y., and Secretary of the ASRE, 234 Fifth Ave., New York 1, N. Y. .....**JUNE 23-25, 1958.**

EXPOSITION AND ASHAE CONVENTION—65th annual meeting, American Society of Heating and Air-Conditioning Engineers (Jan. 26-29, 1959) and 14th International Heating and Air Conditioning Exposition, Philadelphia, Pa. A. V. Hutchinson, secretary of the Society, 62 Worth St., New York 13, N. Y. ..**JANUARY 26-30, 1959.**

METEOROLOGICAL MEETING—163rd National Meeting of the American Meteorological Society, including the 38th annual business meeting, at the Barbizon-Plaza Hotel, New York, N. Y. K. C. Spengler, executive secretary of the Society, 3 Joy St., Boston 8, Mass. .....**JANUARY 27-30, 1958.**

INDUSTRIAL VENTILATION CONFERENCE—7th annual Industrial Ventilation Conference, sponsored by the Michigan Department of Health, and the Department of Mechanical Engineering and Continuing Education Service of Michigan State University to be held at Kellogg Center, Michigan State University. Chairman of the Conference, Continuing Education Service, Michigan State University, East Lansing, Mich. .....**FEBRUARY 17-20, 1958.**

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Personnel Requirements Department
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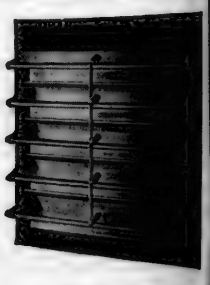

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The items appear in the same order as the advertisements to which they refer, to facilitate obtaining further information after reading an advertisement. NOTE: All advertisements are digested here except those received too late for inclusion. The Index of Advertisers lists all the advertisements in this issue.

Use the postcard below for catalogs, new equipment and materials, as well as Ad-Digest items.

BOILER WATER FEEDERS
For low pressure steam boilers, series of regulators includes units for manually fired steam boilers and automatically fired boilers. Capacities range to 5000 sq ft of radiation. No better protection can be found. Information available.
Inside Front Cover — Item 200

SOUND-POWER OUTPUT CURVES
All company's fans are rated for noise on both the inlet and outlet sides. Ratings in microwatts sound power and decibel sound pressure levels in each of eight octave bands of frequency, measured separately. Information is available.
Page 1 — Item 201

STEAM HEATING, PROCESSING
You are invited to inquire about installation, replacement, or repair of company's most complete line of steam heating and steam processing equipment. A standard of excellence in the steam heating field since 1888.
Page 2 — Item 202

STORAGE WATER HEATERS
Data file offered on copper-lined storage water heaters contains all basic data: Complete specification outline, construction details, heating capacities, engineering, and installation.
Page 5 — Item 203

ELECTRIC MOTORS
Company's increment motor-starter combinations limit inrush of current when starting big motors providing many years of trouble-free operation. Company has been supplying these combinations for 17 years. Bulletins available.
Page 7 — Item 233

WROUGHT IRON FOR SKATING RINKS
A built-in defense against corrosion, 60,000 feet of wrought iron pipe was used at Long Island Sports Arena in Commack, N. Y. Special report by company's engineers, "Iron Skating Rinks — Their Construction and Maintenance," tells how to maintain effective corrosion control in this field.
Page 9 — Item 204

FLUSH VALVES
Company's diaphragm type flush valves were specified in new 575 Lexington Avenue, N. Y., building to provide the rugged performance and graceful appearance to meet modern tailored building design. Information available.
Page 11 — Item 205

HEATING AND COOLING COILS
Manufacturer's smooth-fin coils offer greater transfer per square foot of space area and lower airway resistance, requiring less power per cfm. Bulletin available.
Page 13 — Item 206

AIR CONDITIONED MILL
Modern textile mill illustrated requires accurate control of air temperature, humidity, cleanliness and distribution. Company's fans play an important part in this system. Information available.
Pages 14-15 — Item 207

ROOF VENTILATOR
Company announces a new centrifugal ventilator that cuts power costs. In 16 sizes, all have certified ratings, smooth, quiet operation, and less power consumption. Costs no more than many units without the many quality features built in. Information available.
Pages 16-17 — Item 208

HEAVY OIL PREHEATING SYSTEM
Oil from tank to burner connection always at correct temperature for clean, safe, 100% automatic start-up. No maintenance; no moving parts. Handbook available.
Page 18 — Item 209

EXPANSION JOINT
The manufacturer's expansion joint has an improved one-piece design of body and gland and an improved method of packing which provide new maintenance economies and greater operating efficiency. Bulletin is available.
Page 19 — Item 210

STEEL PIPE FOR WATER SUPPLY
Uniform ductility, length, threading, weldability, wall thickness and size, strength and toughness, and roundness and straightness makes this pipe the best obtainable. Information available.
Page 20 — Item 211

FUEL OIL HEATER
Optimum solution to the problem of providing adequate oil temperature and eliminating possibility of leakage of fuel oil into the HTW stream is furnished in a single exchanger which provides adequate oil temperature, isolation of HTW circuit from the oil circuit and reduction in space requirements at low initial cost. Inquiries invited.
Page 21 — Item 212

ELECTRIC HUMIDIFIERS
Automatic electric industrial humidifiers are designed to provide capacity for practically any size requirements, introducing water vapor, removing up to 70% of all bacteria in the air stream. Catalog available.
Page 22 — Item 213

ROOF AND WALL EXHAUSTERS
Better than "or equal", these exhausters have behind them follow-through engineering and continuing service. Information available.
Page 24 — Item 214

HEATING AND VENTILATING UNIT
Manufacturer's equipment line now includes a heating and ventilating unit which contains all-purpose interchangeable components for make-up air and general ventilation applications. Bulletin is available.
Page 25 — Item 215

ALUMINUM SHEETS AND COILS
Aluminum fin must withstand rapid mechanical forming in production and assembly without developing cracks or buckling and in service must withstand temperature, moisture and mechanical attacks. Company's wrought aluminum alloy sheets and coils have enviable reputation for rigid quality control. Details available.
Page 26 — Item 216

Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information

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Ad-Digest

HIGH PRESSURE BLOWERS
Unusually low noise level, mechanical efficiency 86%, on these Class II-IV blowers for conduit air conditioning, heavy industrial services, and mechanical draft, 3¾ inches and above. Bulletin available.
Page 27 Item 217

AIR FILTERS
Air filters made from glass fiber are stronger, have been tested in service, and are UL approved. They are easy to dispose of. Information available.
Pages 28-29 Item 218

QUIET, DEPENDABLE BLOWERS
A minimum of installation space is required and mounting costs are reduced by these units which are wholly built by the company, including the motor. Three bulletins available.
Page 30 Item 219

VALVES AND FITTINGS
Company's valves and fittings were specified in Chicago's 100-acre Lake Meadows development. Hundreds of units used in plumbing, heating, ventilating, air conditioning systems there. Steel, iron, bronze and lubricated plug, in gate, globe, angle, and check valve types. Information available.
Page 31 Item 220

BANK USES SEAMLESS PIPE
Completely air conditioned, the new Bank of the Southwest Building, Houston, Tex., employs over 150 tons of company's seamless steel pipe in sizes from 2 to 20 inches because of its reputation for trouble-free service under all conditions. Information available.
Page 32 Item 221

STEEL PIPE
Company's pipe, installed in Commercial Credit Building, first major office building erected in Baltimore in quarter of a century, is used for plumbing and heating piping and conduit in electrical system. Pipe is strong, sound, easy to cut, thread, and weld, from ⅛ to 4 inches. Information available.
Page 33 Item 222

AUTOMATIC AIR CONDITIONING
Installation of supervising center in Tampa Electric Company lobby illustrates how central control can be used with 200-ton system for heating and cooling. Temperatures in 17 zones read and adjusted quickly at panel. Individual room thermostats in private offices allow personal temperature selection. Information available.
Pages 34-35 Item 223

NEW ELECTRONIC AIR CLEANER
Removes 6 times more costly dirt than mechanical filters. Removes smoke, fumes, dust, and fly ash. Cuts high cost of cleaning, soiled merchandise. Complete range for any type of air system. Information available.
Page 36 Item 224

TEMPERATURE-MONITOR SYSTEM
Company's temperature monitoring system checks temperature in an entire building from one location. Saves time, work, and reduces maintenance cost. Information available.
Page 37 Item 225

UNIFIED CONDITIONING SYSTEMS
Company offers a complete line of air conditioning products designed, engineered, and manufactured to work together, for large scale central systems or for smaller stores or plants. Information available.
Pages 38-39 Item 226

CONTROLLED ENVIRONMENT
New Ford central staff office bulding is air conditioned efficiently by a system pneumatically controlled. Pneumatic control matches the best systems with far fewer components, less supervision, and greater ease of operation and maintenance. Information available.
Pages 40-41 Item 227

COMPLETE HEATING, VENTILATING
Line includes vertical unit heaters, centrifugal and propeller fans, unit blowers, finned radiation, console heaters, automatic filters, air conditioning units, industrial heaters. Exacting requirements met. Information available.
Pages 42-43 Item 228

HIGH-CAPACITY COILS
Steam coils available in standard and non-freezing types. Water coils for use with chilled or hot water. Direct expansion coils equipped with pressure type distributor circuited for minimum refrigerant pressure drop. Informaton available.
Page 44 Item 229

FANS SET NEW STANDARD
New air foil centrifugal fans set new standard for air handling in building ventilation, general and supply exhaust, conventional and high pressure air conditioning, and combustion air supply. Information available.
Page 45 Item 230

AIR CONDITIONING CONTROL
"The most beautiful building in metropolitan Boston" provides an attractive, pleasing environment, comfortable and highly efficient to work in. Company's accurate pneumatic control system helps workers accomplish more with fewer errors. Once set, thermostat holds temperature constant day after day. Information available.
Pages 46-47 Item 231

PRECIPITATOR CLEANS ITSELF
At the push of a button company's electronic precipitator cleans itself with a set of traveling spray nozzles to maintain filter efficiency at minimum cost and effort. Bulletin available.
Page 48 Item 232

U-BOLT GATE VALVES
Dollar saving features include identification plate, self-centering packing gland, extra deep stuffing box, liberal diaphragm clearance, full length pipe threads, and extra-wide gage, reverable wedge. Bulletin available.
Page 51 Item 234

FULL LINE OF CONTROLS
Solenoid starter; pressure switch for steam, air, water, and non-corrosive liquids and vapors; adjustable high pressure cut-out with range and differential adjustments; low pressure cut-outs; and temperature control are among the complete line contained in new 7th edition of handy catalog offered.
Page 52 Item 235

DUCT INSULATION
Long glass-fiber duct insulation, the logical choice for high-velocity air conditioning systems where cost and performance are prime considerations. Superior thermal efficiency. Costs less to apply because blanket rolls, with vapor barrier adhered, wrap quickly around ducts. Samples and bulletins offered.
Page 53 Item 236

ELECTRONIC CONTROL CENTER
Panel contains instruments for remote temperature indication and adjustment as well as schematic illustrations. System automatically controls and synchronizes many functions of a building's mechanical and electrical systems. Booklet available.
Page 54 Item 237

AIR CONDITIONING LINE
In business for 103 years, company maintains profitable relationship with its franchise holders. Equipment includes packaged units, liquid chillers, air compressors, condensing units, air hoists and cylinders. Details available.
Page 55 Item 238

OVERHEAD GAS UNIT HEATERS
Heaters have patented sealed combustion system using 100% outside air for combustion and removing combustion products outside under positive pressure. Especially applicable in restaurants and food marts. Descriptive literature offered.
Page 56 Item 239

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AIR CONDITIONING, HEATING AND VENTILATING
93 WORTH STREET
NEW YORK 13, N. Y.

AD-DIGEST SERVICE

Ad-Digest

CENTRAL STATION CONDITIONERS
Air conditioners feature dependable, rugged construction, flexibility in location of coil connections and air openings. There are 16 models in either horizontal or vertical types to choose from. Water, steam, or direct expansion coils. Information available.
Page 57 Item 240

DRAFTLESS AIR DISTRIBUTION
How high velocity system provides maximum comfort for schools is described in selection manual. Write on business letterhead for copy. Smaller ducts save space, can be installed faster. No coils in all-air units eliminate clogging, odors. Information available.
Page 58 Item 241

CONDENSATE PUMPS
Economy minded engineers specify these pumps because of their time proven performance in handling condensate. Bronze fittings throughout. Stainless steel shaft insures long life, proper adjustment. Bulletin available.
Page 59 Item 242

RADIANT PANEL HEATING
Unique split system installed in Illinois Institute of Technology meets air change requirements required by Chicago Building Code and at the same time gives occupants the many benefits of radiant panel heating. Panel consists of company's copper water tube. Information available.
Page 107 Item 243

HEATING SYSTEM
The company's heating system makes a separate zone out of every room, assuring tenant satisfaction, fuel savings and economical installation. Booklet is available.
Page 109 Item 244

FANS FOR HARD VENTILATING JOBS
If large volumes of air must be moved at variable pressures and volumes against unpredictable resistance, and space is limited, you are urged to investigate company's 136 standard fans whose motors are placed inside for extra performance per lb. Bulletin available.
Page 113 Item 245

STEAM HUMIDIFIERS
This company will help you humidify an office, cement plant, or church at less cost by steam humidification. Steam is discharged directly into room, duct, or plenum chamber. Relative humidity held within 2 to 4% of setting. Practically no maintenance. Bulletin available.
Page 115 Item 246

SOUND TRAPS KILL DUCT NOISES
In all frequencies. If unit fits geometrically, it fits acoustically. Space saving, it permits guaranteed performance with no bulky mufflers. Applications in every building. Information available.
Page 117 Item 247

BLOWERS FOR HIGH VELOCITY
If the problem involves a high velocity air conditioning system to 8" static pressure the solution is one of this company's units. Available in seven sizes with capacities from 2500 to 22,000 cfm. Bulletin available.
Page 119 Item 248

Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

THERMOSTATIC SHOWER VALVE
Industry's first completely recessed thermostatic shower mixing valve provides built-in beauty for luxurious showers without dangers of protrusion and with greater showering comfort and safety. Information available.
Page 121 Item 249

AIR COOLED CONDENSERS
As engineers plan larger tonnage installations, more of this company's remote type air cooled condensers are sold. They are used with any size compressor regardless of horsepower. Require less horsepower, piping, and installation time. Bulletin available.
Page 123 Item 250

BIG BOILERS
Company's boilers have top reputations because they have lots of outstanding features. Result is successful bidding on big boiler jobs. Information on complete line of boilers, residential or commercial, available.
Page 125 Item 251

BOILER USES HEAVY OIL
Cast iron boiler is built specifically for horizontal rotary burners using heavy oil. Ratings based on I-B-R tests, not formulas. Bulletin contains complete data on unit.
Page 127 Item 252

DUAL DUCT AIR CONDITIONING
Air mixing units are direct volume controls without the use of a sensing instrument. Constant air quantity. Units available made of aluminum inside and out. They are 60% lighter and corrosion resistant. Information available.
Page 131 Item 253

ZINC-COATED SHEETS
The manufacturer's zinc-coated galvanized sheets are claimed to have the tightest zinc coating yet produced. Finished ducts look good and provide long service. Information is available.
Page 133 Item 254

PACKAGE COOLERS
From 7½ to 75 tons, all controls are furnished completely wired and interlocked. All pumps are mounted and piped. Suction line and heat exchanger are fully insulated. Information available.
Page 135 Item 255

THREE UNIT HEATERS
Three unit heaters for modern business and industry: Suspended type is gas fired with choice of propeller fan or centrifugal blower; free standing, direct fired heaters for gas, oil or both; and duct type designed for assembly in custom engineered duct systems. Data available.
Page 136 Item 256

HEATING AND COOLING COILS
The new, completely air conditioned Tishman Building in Los Angeles is an example of the versatility of the manufacturer's heating and cooling coils. It was necessary to design this system so it would meet space requirements of future tenants. Information available.
Page 137 Item 257

INDUSTRIAL VENTILATION
Five reasons for specifying this company's equipment: Broadest product line for every requirement, certified performance, 33 years of specialization, competitive prices, and sold only through qualified ventilation outlets. Catalog offered.
Page 138 Item 258

BOILER LEVEL CONTROLS
Claimed to be the safest because the simplest in construction, these boiler water level controls have permanent magnet located outside float chamber eliminating mechanical parts normally subject to wear and fatigue. Catalog available.
Page 139 Item 259

CONTROLLED HUMIDITY
Air conditioning method removes moisture from air by contact with a liquid in a small spray chamber. Heating and cooling separate. Precise humidity under any conditions. Bulletins available.
Page 139 Item 260

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
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288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304					

PLEASE PRINT Nov. H-57

This service available only to U.S. and Canadian readers.

Name .....

Title or Job Function .....

Firm .....

Nature of Firm's Business .....

Street .....

City .....**Zone** ....**State** .....

This card is void after Feb. 1, 1958

Ad-Digest

REVOLVING UNIT HEATERS
Everybody is comfortable in a plant heated by these revolving heaters which play no favorites. Air streams moving constantly create gentle, refreshing breeze. Bulletin available.
Page 140 Item 261

ICE BANKS
Sweet water ice banks are designed by this manufacturer to deliver tons of 32 to 34-deg F ice water for recirculation through air cooling coils in air conditioning systems. Designed for use with Freon, methyl chloride, or ammonia, the banks may be added to existing systems for increased capacity. Information is available.
Page 141 Item 262

DOUBLE DUTY ROOF VENTILATOR
The adaptability wanted in ventilating buildings which have extra floods of heat or fumes at certain periods is supplied by these ventilators. Unit becomes a gravity-type ventilator when capacity requirements permit. Bulletin available.
Page 142 Item 263

REFRIGERATION VALVES
The company's line of valves designed for refrigeration and other high pressure services feature in-service repacking, tight closure, and large handwheel. Information is available.
Page 143 Item 264

RADIANT ACOUSTICAL CEILING
Economy is now possible with this integrated radiant acoustical ceiling. All radiant duct, aluminum acoustical panels, diffuser panels and framing for recessed fixtures are supplied. Booklet available.
Page 143 Item 265

POWER EXHAUSTERS
Units feature low silhouette, heavy duty performance, ease of installation and service, and full rated capacities. Information available.
Page 144 Item 266

FLEXIBLE HOSE
Extremely flexible, durable and light weight, this flexible hose is adaptable for all kinds of fume and dust control and ventilation uses. Information is available.
Page 144 Item 267

HEAVY DUTY BOILERS
There is a heavy duty, copper tube boiler in this manufacturer's line for every steam or water heating application up to 1.8 million Btu per hr output. Information is available.
Page 145 Item 268

GAS UNIT HEATERS
Years ahead in styling and performance, units are 50% lighter so cost less to ship and install. Eight sizes to 310,000 Btu. Bulletin available.
Page 146 Item 269

STRIP AIR DIFFUSERS
Strip air diffusers combine features of both slot and air diffusers to provide equalized air flow throughout their entire length. The slot diffusers can be located in walls, ceilings, coves, moulds, window reveals, and stools. Catalog is available.
Page 147 Item 270

AIR MAKE-UP UNITS
An air handling system is soon starved, creating a negative pressure or vacuum condition to the detriment of the system, unless adequate air make-up units designed to supply ample, clean, pre-heated air are used. Bulletin available.
Page 147 Item 271

CIRCULATING PUMPS
Engineers choose this company's pumps for heating and air conditioning because they are compact, easy to install and maintain, and give many years of dependable service. Line includes hot water circulating and condensate return pumps. Information is available.
Page 148 Item 272

INTERIOR FIRE PROTECTION
Manufacturer's interior fire protection line more than meets specifications. It also meets the highest standards of safety plus design, practicality and economy. Bulletin is available.
Page 149 Item 273

ROOF VENTILATORS AND CURBS
Company's roof exhausters are known for their high style, performance, and durability, in their bright aluminum housings. Factory fabricated roof curb combines structural stability and sound attentuation. Testing laboratory's report available.
Page 149 Item 274

ELECTRIC AIR DUCT HEATERS
For heating air under forced circulation these electric air duct heaters are efficient, economical. Heaters can be installed easily in round or rectangular ducts and accurately controlled manually or by thermostat. Bulletin available.
Page 149 Item 275

AIR CONDITIONING EQUIPMENT
Twenty-eight full lines of air conditioning equipment are itemized in advertisement. Includes room air conditioners, air handling units, multi-zone types, packaged water chillers, coils, cooling towers, etc. Bulletins offered.
Page 150 Item 276

AIR FILTERS
This line of air filters includes: a viscous type, permanent and cleanable for low velocity systems; one that operates at 300 to 500 fpm; and a permanent, cleanable grease filter for range canopies and kitchens. Bulletins are available.
Page 151 Item 277

WEATHER RESET TIME SWITCH
Outdoor temperature selects comfort heating hours as time switch provides for independent comfort hour settings, separate for every day of the week. Available with 20 hours of spring carry-over. Information available.
Page 151 Item 278

IN-DUCT HUMIDIFIERS
Honest humidification for real winter air conditioning. Data including details on the product, its application, and how to develop this new business sent without obligation.
Page 151 Item 279

VENTILATOR DATABOOK
Databook offered includes company's complete ventilator line, a type and size to put air to work most efficiently and economically for any specialized need.
Page 152 Item 280

DUCT SILENCER
The new silencers for air conditioning and ventilating systems have been designed specifically to reduce the air-borne noise generated by fans in industrial air conditioning and ventilating systems. Low original and installation costs. Literature available.
Page 153 Item 281

AUTOMATIC SHUTTER
The most substantial building shutter on the market, the only one with an angle-iron frame, is noted for its durability and long life. Catalog available.
Page 154 Item 282

FORCED DRAFT COOLING TOWERS
Company lists four representatives for its new forced draft cooling tower. Literature available.
Page 154 Item 283

FILTER-DRIER
Drier incorporates an activated ceramic desiccant block for micronic filtration in combination with granular desiccant for high-efficiency drying with low pressure drop. Information available.
Inside Back Cover Item 284

PUMP CONTROLS
The whole story of this company's series of water level controls, cut off switches, etc., are contained in a boiled-down, useful form with service recommendations, installation drawings, and wiring diagrams, in bulletin offered.
Back Cover Item 285

Postage Will be paid by Addressee

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BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 58, SEC. 34.9, P. L. & R., NEW YORK, N. Y.

AIR CONDITIONING, HEATING AND VENTILATING
93 WORTH STREET
NEW YORK 13, N. Y.

AD-DIGEST SERVICE

HIGH WORKING PRESSURE—500 PSI
LOOK AT THAT TRANSVERSE FLOW
LOOK! GRANULAR DESICCANT TOO
BRASS END CONNECTIONS—EASIER TO SEAL
AN ENTIRELY NEW DESIGN
FILTER "Dri-Cor"* DRIER
*TRADEMARK
ABSO-DRY PRESSURE SEALED DRIER
NO FOOLING, LESS PRESSURE DROP
CERAMIC FIRED DESICCANT BLOCK
OH BOY! MICRONIC FILTRATION TOO
ABSO-DRY PRESSURE SEALED "THEY HISS & TELL"

See our Exhibit
BOOTH 669
10th Exposition
Air Conditioning &
Refrigeration Industry
International Amphitheater
Chicago Nov. 18-21.

"DRI-COR"...

a New Name—a Finer Filter-Drier

■ You can expect the best from Henry. Here's the new "Dri-Cor" Filter-Drier. It incorporates an activated ceramic desiccant block for micronic filtration in combination with granular desiccant for high efficiency drying with low pressure drop. Drying and filtering are properly proportioned.

Like other Henry Driers the "Dri-Cor" is thoroughly reactivated and pressure sealed at the factory, through the exclusive patented Henry Abso-Dry process.

This assures maximum drying efficiency at the time of installation. See this new type Filter-Drier at the show. It is definitely a "must" for those who demand the best.

HENRY VALVE CO.
MELROSE PARK, ILLINOIS (Chicago Suburb)
Cable: Hevalco, Melrose Park, Illinois
VALVES, DRIERS, STRAINERS, AND ACCESSORIES FOR REFRIGERATION, AIR CONDITIONING, AND INDUSTRIAL APPLICATIONS

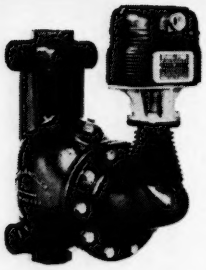
LISTED BY UNDERWRITERS' LABORATORIES, INC. UNDER RE-EXAMINATION SERVICE FOR MAXIMUM WORKING PRESSURE OF 500 PSI

For jobs like these...

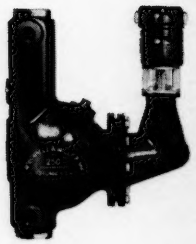
Choose from this McDONNELL Line-up

- Boiler Feed Pump Control
- Low Water Fuel Cut-off Switch
- Low Water Alarm Switch
- High Water Alarm Switch
- Electric Valve Control
- High and Low Level Tank Control

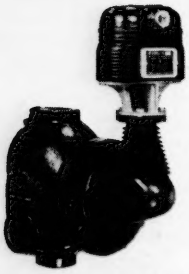
No. 92—For any size boilers or tanks with pressures up to 250 psi. Installed with top and bottom equalizing piping. Used on boilers equipped with separate water column.



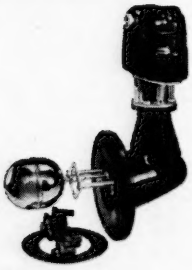
No. 192—For fire-tube boilers with pressures up to 250 psi. Has integral water column for gauge glass and try-cock trim. Holds minimum efficient water level.



No. 292—For water-tube or high set boilers where more visible water in gauge glass is desired. Has integral water column. For pressures to 250 psi.

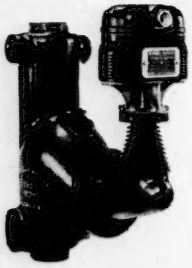


No. 92A—Has lower side equalizing connection. Same features as all 92 Series: operating levels easily adjusted, ample float clearance, low switch terminal temperature, etc.

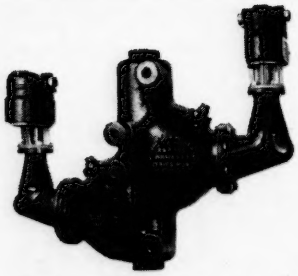


No. 92-HD—For flange mounting on tanks or water columns. For pressures up to 250 psi. No. 91-HD also available for pressures up to 150 psi.

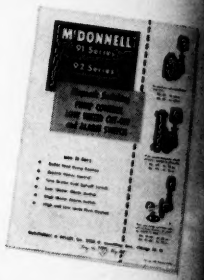
No. 91—For any size boilers or tanks with pressures up to 150 psi. Used on boilers equipped with separate water column. Same repulsion magnetic switching for positive operation.



No. 191—For boilers up to 150 psi. Integral water column. All 91 and 92 Series controls have two single-pole double-throw switches. Ideal for motor operated valve control.



No. 291—For applications requiring very wide operating differentials. Pressures to 150 psi. Commonly used with duplex pumping arrangements.



Write for Bulletin L-123

Has the whole story of the McDonnell 92 and 91 Series controls in a boiled-down usable form. Contains service recommendations, installation drawings, wiring diagrams, etc.

Underwriters Listed • C.S.A. Approval No. 5545.

Your Jobber Stocks Them

McDonnell & Miller, *Inc.*, 3500 N. Spaulding Ave., Chicago 18, Illinois

Doing One Thing Well

McDONNELL Boiler Water Level Controls and Safety Devices